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CONTENTS

NEW ENGLAND SURGICAL SOCIETY

Craniocerebral Injuries from the Point of View of the General Surgeon. *Edward H. Risley.* 601

Hospitalization of Cancer in Massachusetts. *George H. Bigelow* and *Herbert L. Lombard.* 607

Avertin as a Basal Anesthetic. *Frank William Marvin* 609

Blood Pressure Fall Occurring in Avertin Anesthesia. *Grantley W. Taylor* and *Charles C. Lund* 612

The Bill to Register Chiropractors. *Stephen Rushmore* 614

Mortality and Expectation of Life in Mental Deficiency in Massachusetts: Analysis of the Fourteen-Year Period 1917-1930. (*Concluded.*) *Neil A. Dayton, Carl R. Doering, Margaret M. Hilferty, Helen C. Maher,* and *Helen H. Dolan* 616

Spontaneous Rupture of the Heart. *Frederick R. Barnes* 631

Horseshoe Kidney. Report of Unusual Form. *Joseph Tartakoff* 633

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Case 18121—A Case with the Clinical Appearance of Neurosis but with Fatal Termination. *Earle M. Chapman, Maurice Fremont-Smith, Tracy B. Mallory, George W. Holmes, Arlie V. Bock, Aubrey O. Hampton* and *Chester M. Jones.* Case 18122—Gross Hematuria in a Man of Sixty-four. *M. Morris Pinckney, William Bradford Robbins, James Howard Means, Arlie V. Bock* and *Tracy B. Mallory.* 635

EDITORIALS

A New Pituitary Syndrome 643

Public Health Organization 643

This Week's Issue 644

(*Contents continued on next page*)

NEW—*Trumper and Cantarow*—NEW

Biochemistry in Clinical Medicine

CLINICAL INTERPRETATION OF LABORATORY FINDINGS

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CONTENTS

(Continued)

THE MASSACHUSETTS MEDICAL SOCIETY

Have Your Dues for This Year Been Paid?..... 645

MASSACHUSETTS LEGISLATIVE NOTES..... 645

MISCELLANY

An Award to Dr. Stephen J. Maher..... 648
A Bequest to the New England Deaconess Hospital. 649
Dr. Bigelow Elected President of the American Society for the Control of Cancer..... 649
Comparison of Disease Incidence in Connecticut with 1931 and Seven Year Average Month Ending March 5, 1932..... 647
Dr. Hugh S. Cumming Begins His Fourth Term in Office..... 649
Heart Disease in New York City..... 606
Dr. James A. Keenan Appointed Hygiene Director. 649
Dr. Mahoney Objects to the Bill Before the Legislature Relating to Milk..... 648
Meeting of the Boston Federation of Women's Clubs, March 18..... 648
Dr. Richard H. Miller Addresses the Central Labor Union..... 648
New Medical Centre..... 649
Dr. L. E. Phaneuf Addresses the Rhode Island Medical Society..... 648
Rabies Quarantine..... 646
A Radio Message Prepared and Sponsored by the Committee on Public Education of the Massachusetts Medical Society for the Department of Public Health. Health in Industry..... 645
Report on Infant Mortality..... 606
Résumé of Communicable Diseases in Massachusetts for January, 1932..... 647
Spot Pond Requires Attention..... 649

NOTICES..... 650

OBITUARY..... 649

RECENT DEATH..... 649

REPORTS AND NOTICES OF MEETINGS..... 651

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES..... 658

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NEW ENGLAND SURGICAL SOCIETY

CRANIOCEREBRAL INJURIES FROM THE POINT OF VIEW OF THE GENERAL SURGEON*

BY EDWARD H. RISLEY, M.D.†

IT might seem presumptuous for a general surgeon to present a paper on a subject which is regarded, in the larger cities, as almost a specialty were it not for the fact that the type of case described is more and more frequently becoming the problem of the surgeon who does his work in the more remote rural communities, away from immediate contact with the neurologist and the brain surgeon. I propose, therefore, to discuss this subject from the point of view of the surgeon in the smaller community and not from that of the specialist, for I believe that the problem presented to the general surgeon, working alone, is often a difficult one, and that if the handling of all cerebrocranial injuries could be more thoroughly systematized, the matter would at once become simplified to a great extent.

In recent years the automobile and the motorcycle have added a heavy burden of difficult and trying traumatic problems. Not least of these are the severe types of head injury, which are steadily increasing. The results of such injuries are, in many cases, far reaching, in the way of impaired efficiency and of economic loss both to the individual and the community.

Should the patient, with a severe head injury, be fortunate enough not to die at once, he may yet be unfortunate enough to live on with a handicapped mentality and hence become a source of concern to himself and those dependent upon him. Even if he eventually makes a complete recovery, his time of hospitalization and invalidism is likely to be protracted and expensive. It is, therefore, evident that any method of treatment, or any plan of handling these cases, which is an improvement over our present routine will be welcome.

An inquiry into the present-day methods of treating traumatic head cases impresses one with the fact that, until very recently, there has existed a noticeable lack of system in their management. There seem to be no exact or hard-and-fast rules to follow. Empirical rather than exact methods are the rule. The general surgeon, especially in the smaller communities, is considerably handicapped by a lack of knowledge of the refinements of neurologic diagnosis and the inability to command a ready neurologic consultant, but even in the larger centers one still finds the treatment of head injuries not at all systematized, as one would expect to be the case, where large numbers are seen each year.

The failure to employ a well laid down and systematized plan of procedure is due, we believe, in some small part to lack of knowledge of surgical neurology, but mostly, to want of an adequate classification of the different types of injury and hence a lack of a rational plan of treatment. If a more simple and less confusing classification were available, it would seem reasonable that a well-defined mode of treatment could be worked out which would be much more efficacious than that offered by the rather experimental methods now generally in use. This applies, particularly to those of us who practice in the smaller communities and who have to rely on our own more limited experience in solving these problems.

Recent contributions by Rodman of Philadelphia, Jackson of Chicago and Munro of Boston have helped to clarify the situation to a very considerable extent. These authors have shown that the great stumbling block in the past has been the confusion over the terms "concussion," "contusion," and "compression" of the brain. As a matter of fact, these terms, and the conditions they aim to describe, are not clean-cut, but merge one into the other, so that the picture is an ill-defined, and often a confused one. On such a basis no clearly defined line of treatment could be hoped for. But, when we discard this nomenclature, and think of the conditions represented in terms of intracranial pressure, we immediately find that we have a foundation upon which a logical basis for both classification and treatment can be built.

The reliance formerly placed upon the blood pressure as an index of the severity of an intracranial lesion has had to be abandoned. It has become evident to those dealing with a large number of head injuries that the blood pres-

*Read at the annual meeting of the New England Surgical Society, September 11, 1931, at Portland, Maine.

†Risley—Member, New England Surgical Society. For record and address of author see "This Week's Issue," page 644.

sure alone may give a very false impression of the severity of the case. It may be low at first, due to the initial shock, and, when it at last arises to a sufficient height to serve as a danger signal, it may be too late to serve as an operative indication in preventing permanent cerebral damage. Definitely increased blood pressure should be looked upon with apprehension, as a late rather than an early sign of increased cerebral pressure.

It would not seem necessary to discuss the question of the element of danger in doing spinal tap in these acute cases, for the emergency within the skull is so great, because of the rapid accumulation of fluid within its closed walls, that permanent cerebral damage is quickly accomplished unless this rapidly accumulating fluid is speedily removed. Edema and hemorrhage, accompanying the more severe grades of brain injury, immediately result in the interference with absorption of cerebrospinal fluid by the normal paths, and a vicious circle is set up, which causes further pressure on the brain and a resulting cerebral anemia. This anemia, if not relieved at once, leads with great rapidity to gliosis and lasting changes in the cerebral tissues, which, in turn, effect permanent changes in the disposition, character, and mentality of the patient. Relief of this tension is, therefore, essential and should be brought about without delay. It is best accomplished by repeated spinal taps. It has further been demonstrated that this procedure, if carried out as a routine, will, in the vast majority of cases, obviate the necessity of later decompression operations.

This measure is especially applicable to cases of fracture of the base of the skull. The picture, in the more severe types of fractured base, is rarely clean-cut, and, unless we are able to get an absolute confirmation by x-ray, we are likely to have a confused and ill-defined picture presented, and we can make a diagnosis only by a process of elimination. If however, we estimate the extent of cerebral damage by a measurement of intracranial pressure, we can obtain a much more clearly defined picture, and our treatment can be worked out much more logically.

We wish to emphasize the fact that the important consideration, in all types of head injury, is the prevention of cerebral damage. This is to be accomplished by efforts to keep the intracranial pressure as nearly normal as possible, but, before resorting to any of the various methods of reducing pressure, we must ascertain the existing pressure in each individual case. The exact determination of intracranial pressure can be obtained only by the use of spinal puncture and the spinal mercury manometer; in this way only can we obtain an accurate measure of tension, free from guesswork and personal equation.

In the light of the foregoing considerations it would seem that a classification based upon the degree of intracranial pressure would be most logical. The following is a classification, very similar to that proposed by Rodman, which we believe meets the requirements of being both logical and workable, and which we have found to be very helpful in the management of our cerebrocranial cases.

GROUP I

Intracranial pressure—no increase (i.e., 8 to 10 mm. of Hg.).
Unconsciousness—may or may not be present.
Eye grounds—normal.
Reflexes—no change.
Blood pressure—slight or no increase.

These are the milder forms of injury and correspond, in general, to those cases ordinarily described under the term *"Concussion."*

Treatment: Rest in bed, icecap to head, catharsis and sedatives if necessary. Spinal tap on admission and once later as a check-up, and daily eye-ground examinations.

Prognosis good; there is usually recovery in 4 to 8 days, without residual symptoms.

GROUP II

Increase in intracranial pressure — moderate (10 to 18 mm. of Hg.).
Unconsciousness—generally present and lasts several days.
Eye grounds show retinal congestion only.
Reflexes—sometimes slight variations from the normal.
Blood pressure — moderately elevated, and pulse slightly slowed.
May have nausea and vomiting.

Cases in this group correspond in general to the "contusion" type.

Treatment: Rest in bed, icecap to head, dehydration by means of magnesium sulphate by mouth and by rectum; more frequent spinal puncture, often enough to keep pressure near normal.

Prognosis guarded.

About 70% of all head injuries are included in the two groups above.

GROUP III

Increase of intracranial pressure — marked (above 18 mm. of Hg.).
Unconsciousness—profound.
Eye grounds show marked congestion followed by edema.
Reflexes—abnormal.
Blood pressure—high, compression pulse with vomiting, stertorous respiration, and rise in temperature.

These cases correspond to "compression" and laceration groups.

Treatment: If intracranial pressure is not effectively and permanently relieved after 3 or 4 tappings (done every 2 to 4 hours, according to circumstances), a subtemporal decompression should be performed for drainage.

Prognosis bad both for recovery and permanent improvement.

These three groups, it will be seen, contain practically all forms of head injury of the acute type, except those with depressed or compound fracture and those with extradural arterial hemorrhage, in which the indications for immediate operation are unmistakable.

It is evident, it seems to me, that the above grouping greatly simplifies our classification and emphasizes at once the value of an estimation of the intracranial pressure and its interpretation in weighing indications for treatment.

Jackson paints the picture clearly when he states that "the symptoms usually depended upon for indications to surgical intervention, such as slow pulse, high blood pressure, and stertorous respiration and vomiting, are LATE SYMPTOMS and are due to medullary pressure. Surgery is apt to be of little avail if we wait until the medulla is involved. Estimation of intracranial pressure, therefore, is of greatest importance, because this increase in pressure antedates the appearance of the secondary symptoms of medullary pressure by many hours. The relief of intracranial pressure can be obtained early and safely by repeated spinal tap. The relief so obtained prevents medullary compression and the symptoms usually looked upon as indications for operation in many cases do not appear."

We have come to believe, therefore, that if spinal tap were carried out in *all* cases of severe head injury, we should obtain a quicker and more clean-cut picture of our case, probably less frequent operative indications, a quicker recovery in the less severe cases, an earlier estimate of prognosis, and probably a more hopeful outlook as to future mental condition in the more severe cases.

It is further believed that if a printed set of rules, to be followed out in all head cases, immediately on admission to the hospital, were posted for the guidance of house officers and nurses in all larger hospitals and for surgeons in the smaller communities, far better results than those at present, could be obtained.

The following is suggested as the routine procedure:

1. Elevate the head of bed.
2. Icecap to head.
3. Iodine to nose and ears.
4. Ten per cent argyrol to eyes 2 i.d.
5. Mouth hygiene.
6. Hourly record of pulse, temperature, respiration and blood pressure.
7. Fundus examination t.i.d.
8. X-ray of skull.
9. Spinal tap with manometer reading on entrance and as often as indicated, until patient is out of danger.
10. Four ounces of 50% magnesium sulphate solution as a retention enema if not able to give it by mouth.
11. Rectal feedings if necessary—and they are often necessary as the totally unconscious patient is unable to swallow.
12. Neurologic consultation, by letter or telephone if not in person.

It seems evident that if such a routine were carried out in *all* cases, we would be able to accomplish several definite results:

1. A more rapid and more accurate diagnosis of the exact lesion present.
2. More adequate and more rational treatment, based on exact knowledge of the amount of intracranial tension.
3. Earlier operative interference, when indicated.
4. Fewer decompression operations because of the relief of tension obtained by spinal tap; and
5. A lessened mortality, especially in the more severe type of case.

If results are to be improved in these traumatic head cases, it would seem necessary that a routine and definite plan of treatment be strictly adhered to in all cases, so that some order may be brought out of past confusion.

It is believed that the treatment of head injuries, based upon the degree of intracranial pressure is the greatest advance so far made in the treatment of this type of injury, and is particularly helpful to the general surgeon working alone in a smaller community.

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DISCUSSION

DR. C. L. SCUDDER, Boston, Mass.: Gentlemen, we have had this subject presented in this brief and concise way by a surgeon with experience and training, Dr. Risley, and it is certainly valuable for us all.

I want to say just one or two words apropos of Dr. Risley's paper. Acute head injuries are very generally neglected today. The profession of medicine moves forward slowly, en masse, along the middle of the road, advancing knowl-

edge generally flitting in from the outskirts (sometimes from the mass itself), brought about by laboratory workers, by specialists, by ultra-conservatives, and sometimes by radicals who often get into the ditch on either side of the road. I must confess I was going along with the mass until Dr. Donald Munro set me straight. In his neurologic course of lectures, which I hope will become an institution at the Boston City Hospital year after year, one finds the fundamentals of the treatment of head injuries carefully presented in detail. It is a perfectly splendid contribution to this whole subject.

The treatment of fracture of the long bones is far from being perfect, but improvements have come about and results in general are better than a few years ago. The underlying reason for this is in the fact of the better adaptation of treatment to the pathology of a fracture. Head injuries form no exception to the general rule. Fractures of the skull are rarely, if ever, the cause of death. The vast majority of cases that die from head injuries die from increased intracranial pressure or hemorrhage. A few develop meningitis.

Today the operative relief for fracture of the skull has been abandoned. It is indicated under two conditions only: in compound fracture and in extra- or subdural hemorrhage. In head injuries we are dealing with a problem of the response of the physiology of the cerebrospinal fluid.

The past study and treatment of head injuries over a long period of years, and the conclusions reached, are not altogether to be scrapped. The fracture of the skull per se is unimportant as compared with the damage to the soft parts, the brain. That is exactly what has come to be recognized as true in connection with injuries to the long bones. The relief of increased pressure on the brain, the reëstablishment of the normal path of absorption of the cerebrospinal fluid, can be secured by lumbar puncture, which is absolutely devoid of danger in acute cases. Those who object to lumbar puncture are usually those who are interested in and have clinics handling cases of chronic intracranial increased pressure and tumors, usually located below the tentorium.

Death following lumbar puncture and withdrawal of cerebrospinal fluid is, of course, a serious thing. The reason for the death is that the conditions present in chronic pressure from tumor are quite different from the conditions present in acute intracranial pressure due to injury. I believe the weight of evidence is in favor of the practical safety of lumbar puncture in acute head injury cases.

In the past in head injuries with shock it has been customary to give normal saline solution in fairly large quantities to assist in the treatment. The giving of this fluid intravenously sometimes may cause a cerebral edema so we must modify the treatment of shock in these cases.

By the introduction of hypertonic glucose intravenously, the intracranial pressure is reduced and the blood volume increased synchronously. At the same time shock is diminished. A minimum amount of fluid should be given to a patient during shock to avoid the increasing intracranial pressure which occurs four to eight hours after injection.

I think Dr. Risley's paper is important—I have been very much surprised at the general ignorance of surgeons with regard to the proper, adequate and rational treatment of these cases. We have been brought up, as Dr. Risley has intimated, to analyze the evidences of concussion, of contusion, and of laceration, as pointing to contusion and laceration of the brain. I believe I am right in thinking that the very careful observation of head injuries in the past, where the blood pressure, the pulse, and the pupils and all physicial signs were observed, should not be thrown away, but we should remember that they simply help in the studying of a case. We must remember that the actual pathology of these cases has been overlooked in the past and the presence of increasing intracranial pressure which is remediable has not been so sufficiently well recognized as to form a basis of rational treatment.

In closing I should like to leave a word of practical consideration in this matter. It is that one of the Regional Fracture Committees of the American College of Surgeons — the Regional Committee in Seattle, for there are about twenty-six such committees throughout the country —under the Chairmanship of Dr. Goodnow, who is the Medical Adviser to the Department of Labor and Industry which handles the state insurance in industrial matters in Washington— conceived the idea, because of the increasing costs in the cases of head injury, to issue a booklet on the subject.

In the State of Washington there are many forests and much forestry and many mills and lumber camps and they found that the cases of head injury were not being adequately taken care of and consequently the state had to pay an enormous amount of money in damages. The result is that the Committee compiled a series of sheets, a little monograph on head injuries and their care, of eight or ten pages. It was mimeographed and a copy was mailed to each member of the State Society in Washington.

It has done an enormous amount of good. They have taken up, in this monograph on head injuries, the procedures which the practical surgeon, meeting the cases in the first instance, must and should follow out.

I cite this as an illustration of two things: (1) the recognition of the growing importance of these head injuries; (2) the fact that much good can be done by movements of this kind in all committees. I congratulate Dr. Risley on the timely presentation of this subject of Head Injuries.

Dr. William J. Mixter, Boston, Mass.: I feel that Dr. Risley's paper is a very valuable contribution. He has formulated a scheme of treatment of craniocerebral injuries which will be of great assistance to the surgeon seeing a number of these cases during the year, particularly in those communities where motor accidents are becoming more and more common.

Personally I do not believe that every case of cerebral injury needs a lumbar puncture. The cases placed in Group I by Dr. Risley may frequently be treated without lumbar puncture unless they are showing evidence of increasing pressure in other ways than by the manometric readings. I think we must remember that although lumbar puncture is used very freely and, as a rule, is completely devoid of danger, still there are certain cases where head injuries followed by lumbar puncture have resulted in sudden death from respiratory failure.

Dr. Donald Munro, Boston, Mass.: I think Dr. Risley is to be sincerely congratulated on putting together his paper in such an able fashion and bringing out the point that in treatment of these head injuries, particularly the brain end of them, systematization is of very great use and will without doubt save many lives that have been lost and save the community from having to support many invalids they would have to otherwise.

He has spoken of using as the basis for his treatment Rodman's classification which is certainly a very excellent classification, but one which I have found in my clinic at the City Hospital does not always hold true. We have been forced to modify it more or less and change to a basis of pathological diagnosis rather than the degree of rise in intracranial pressure. We find that many of the cases that Rodman places in Class I will at times show a very high intracranial pressure, much higher than one ordinarily expects, and if you stick closely to his classification, these cases do not fit in because they have no blood in their cerebrospinal fluid. They are mild head injuries but they do carry the high intracranial pressure.

So it is with the cases he puts in Class III. Those may run relatively low intracranial pressures, high, to be sure, but lower than one would expect if one stuck closely to his classification. So we have adopted a classification at the City Hospital based on pathology and as a result we divide our cases into three classes: edema and contusion; edema and laceration; and edema. We have also a fourth class which includes all the fractured skulls where the fracture of the bone enters into the problem in any important fashion.

We consider cases that show no blood and a high intracranial pressure or normal intracranial pressure following injury to the head associated with loss of consciousness, as of the congestion and edema group. There is no question that they do have such pathology some time, but it may have cleared up by the time you see them.

The second class includes those cases where there is gross blood in the cerebrospinal fluid of a sufficient amount to color the fluid pink or pinkish red. The third class includes the lacerated brain cases, where the cerebrospinal fluid is to all intents and purposes pure blood. Such cases all have high intracranial pressure usually.

I have here figures from my neurosurgical clinic dating from the first of last January, which I thought might be of interest to you in connection with this problem. During that time there were discharged from the clinic thirty cases of congestion and edema of the brain, with no deaths, and forty-three cases of either laceration or contusion of the brain, in which seven died, two of surgical shock, two of pulmonary edema, one of lacerated brain, and one of meningitis.

We don't classify the cases of skull fracture in such a manner as to divide the fractures of the base from those of the vertex. I believe it is of no importance and leads nowhere in the treatment or prognosis of these cases. In this group there were twelve cases of linear fracture of the skull and three cases of plain depressed fracture. One died of lacerated brain without operation. The other two were discharged and returned later for operation and are still alive.

There were nine cases of compound fracture of the skull, two not operated and first admission but allowed to heal up and return in four months for operation later because the compound element of the fracture was not recognized for the first three days. There were therefore seven operated upon at once. There were no deaths. By using the débridement method of operation we were able to get 100 per cent healing in the wounds. Mortality in these fracture cases was 12 per cent.

Mortality, including the congestion and edema and laceration or contusion and edema cases based on a series of 73 cases with 7 deaths, was 9½ per cent, and the total mortality for the whole series, including all the cases, of which there were 97, was 10.3 per cent. Nine additional cases were discharged against advice before treatment.

As to the question of danger of lumbar puncture, I think that is perhaps still sub judice, but I doubt if it should remain so any longer. I have done a good many lumbar punctures

and have had some deaths apparently following lumbar puncture. Fortunately, I have been able to secure autopsies on all such cases and in no case was there evidence of cone formation. The deaths were due to the brain injury and not to the methods used in treating them.

My opinion is that lumbar puncture in these acute cases is a safe process and, as Dr. Risley so wisely urges, should be universally adopted.

Another problem is that of standing orders. Standing orders are certainly a very great advance in treatment of these cases. I believe, though, that one thing should be included in standing orders and that is, that there should be a definite order that no case is to receive any morphine. I have seen cases killed by morphine and I think there should be a definite order written against it. The morphine is usually used to control restlessness of the patient but I believe that this is due to increased intracranial pressure and will clear up when you have reduced the pressure to normal and will not clear up otherwise in severe cases unless you use such large doses of morphine as to endanger the patient's life.

DR. E. H. RISLEY: I have nothing further to say. I am very much obliged to Dr. Munro for his remarks, which are very interesting.

REPORT ON INFANT MORTALITY

The lowest infant mortality rate ever attained by the cities of this country was that of 1930, according to the Statistical Report of Infant Mortality, based on the records of 860 cities in the Birth Registration Area of the United States, just issued by the American Child Health Association. The 1930 rate—62.2 deaths for every thousand live births—is four points lower than that of the preceding year, when it was 66.2.

Inclusion in the Birth Registration Area depends on registration laws accepted as satisfactory by the United States Census Bureau and on assurance that at least 90 per cent of the births are registered. All but two states are within this Area. The 860 cities reporting from this Area had a population of 10,000 or over in 1930. The report also gives infant mortality rates for 14 cities outside the Birth Registration Area, eight of them in Texas and six in South Dakota.

Seattle, with an infant mortality rate of 37, heads the list of cities with a population of over 250,000. San Francisco ranks next, with 40, and Portland, Oregon, is third, with a figure of 41. In the preceding year, 1929, Portland led, Seattle was second, and Minneapolis third.

Among the ten largest cities in the country in 1930, two are tied for first place, Chicago and St. Louis, each with an infant mortality rate of 54. Cleveland stands next with 55, and New York follows with 57. Boston and Pittsburgh foot this group with 69 as their figure. Nine of these ten cities, however, show lower rates in 1930 than in 1929.

Long Beach, California, with a rate of 43 leads the cities in the 100-250,000 class. Oak Park, Illinois, stands at the top of the 50-100,000 class with a rate of 28. Alameda, California, with 21 as its figure, ranks first in the 25-50,000 class.

Among the smallest cities, with populations from 10-25,000, Shorewood, Wisconsin, is at the top with its infant mortality rate of 0.

As in other years, the states on the Pacific Coast and in the Rocky Mountains offer to babies their best chances for survival. The lowest urban infant mortality rate is in the State of Washington, where the figure is 41. Idaho comes second with a rate of 44, Oregon third with 48, and then three states each with 50, Utah, Nebraska, and Montana.

It has been customary to publish this report in the middle of the year, Dr. Samuel J. Crumbine, General Executive of the American Child Health Association announces, but a delay was necessary this time because of the work involved in the decennial census of 1930 which prevented the Census Bureau from issuing as early as in previous years its Summary of Provisional Birth, Death and Infant Mortality Figures. The purpose of this statistical report, prepared under the direction of Dr. George Truman Palmer, Director of the Association's Division of Research, is to stimulate public opinion to support the work being done by the health officials and voluntary health agencies of the country in endeavoring to reduce the number of infant deaths.—*Bulletin American Child Health Association.*

HEART DISEASE IN NEW YORK CITY

More than 190,000 persons have died of heart disease in New York City during the last twelve years, according to the report made public by the New York Tuberculosis and Health Association. This report is the result of a survey of the period 1920-1931 inclusive, under the direction of John Wyckoff, Chairman of the Committee who is also Associate Professor of Medicine at New York University Medical School. This report will be distributed to heart clinics, health associations, convalescent homes and similar institutions. A steady increase from heart disease has been recorded nearly every year in New York City. It has been found that mortality from this affection is not confined to the aged alone, although the crest of the deaths from heart disease in the city during the period studied is reached in the age group between 60 and 65.

HOSPITALIZATION OF CANCER IN MASSACHUSETTS*

BY GEORGE H. BIGELOW, M.D.,† AND HERBERT L. LOMBARD, M.D.†

As a result of the concerted drive against cancer which has been in progress in Massachusetts for over five years this disease is receiving more attention in the Commonwealth than ever before. The Massachusetts hospitals are caring for an increasing number of patients and the quality of their service is steadily improving. These facts have been ascertained by a comparison of recent hospital records with previous ones.

In 1926 the Department obtained information from the original cancer records of ninety-one hospitals in the Commonwealth. In the summer of 1931 return visits were made to eighty-six of these hospitals and comparable information obtained. The eighty-six hospitals comprise about 75 per cent of the bed capacity in the general hospitals of the State as well as that of the special hospitals which deal with cancer or chronic disease. The study is based on three-year averages, 1923-1925 and 1928-1930 for all but eleven of the eighty-six hospitals in which it was necessary to use for the earlier period either a two-year average or the records for one year. During this period the Pondville Hospital for cancer has been opened and the average cases for 1928-1930 are included in this paper but not in the comparative figures.

Cancer deaths have increased in the State 13.6 per cent in the five-year interval, while hospital admissions for cancer in the same period have increased 33.9 per cent and terminal cases in hospitals have increased 36.8 per cent. This increase in cancer admissions has been noted in sixty-two of the eighty-six hospitals.

Table I shows the increase by location of cancer. This increase in hospital admissions appears for all locations and is greater than that of the deaths in the State for the same locations. With the exception of buccal cavity, cancer deaths in hospitals have increased for all locations, and with the same exception the increase is greater than that for deaths in the State. The most obvious increases are in those of cancer of the female genitals and of the skin, both of which offer opportunity for cure. If the 539 cases at the Pondville Hospital had been included, and it would be logical to include them as Pondville has been opened since the earlier study, the increase in Hospital admissions would be 47 per cent. (Table II.) In spite of the increased resources offered by the State at Pondville the other hospitals are steadily increasing their share of the cancer load, and doing this at a higher rate for all types of cancer than the increase of deaths in the State.

TABLE II
PONDVILLE HOSPITAL ADMISSIONS
Average (1928-1930)

Buccal Cavity	100
Stomach	62
Intestines	46
Breast	77
Female Genitals	96
Skin	91
Others	67
Total	539

TABLE I
INCREASE IN THE HOSPITALIZATION OF CANCER

	Massachusetts Cancer Deaths			Hospital Cancer Admissions			Cancer Deaths in Hospitals		
	Average 1923–25	Average 1928–30	Percentage Increase	Average 1923–25	Average 1928–30	Percentage Increase	Average 1923–25	Average 1928–30	Percentage Increase
Buccal Cavity	281	205	-27.0	393	424	7.9	36	22	-38.9
Stomach	1576	1686	7.0	705	757	7.4	192	251	30.7
Intestines	912	1083	18.7	528	732	38.6	137	238	73.7
Breast	542	639	17.9	668	844	26.4	54	66	22.2
Female Genitals	697	759	8.9	836	1146	38.1	99	118	19.2
Skin	105	86	-18.1	106	166	55.6	7	8	14.3
Others	902	1241	37.6	857	1410	64.4	200	289	44.5
Total	5015	5699	13.6	4093	5479	33.9	725	992	36.8

At the instigation of the cancer program it was felt that there was a strong probability that when the State offered service for this disease many of the hospitals would show a tendency to pass the burden to the government. This has not materialized, and, as a result, cancer patients are receiving service such as has never before been offered. It seems reasonable to assume that the intensive program carried on in Massachusetts by the combined efforts of the Massachusetts Medical Society, the American Society for the Control of Cancer, and the Massachusetts Department of Public Health is responsible. Individuals are becoming more cancer-minded, and

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while in a few cases phobia has been aroused, in the vast majority of individuals a desire to face facts squarely has become manifest. The Massachusetts Medical Society has coöperated in the movement by furnishing graduate courses in cancer and the medical profession today is far more alert in recognizing incipient cases. A large number of thoughtful people have allied themselves with the cancer movement by serving as members of the lay committees connected with the cancer clinics or as correspondents representing the Department in communities where no cancer clinics exist.

In face of the greater and better facilities for cancer treatment there is an insistent demand for increased hospitalization as evidenced by the waiting list at Pondville which during 1931 has shown an average of 32 cases per day. Any program which stimulates the public to a recognition of adequate treatment carries in its wake a demand for greater facilities. This has been evidenced in such departmental activities as water purification, sanatorium treatment for tuberculosis and the administration of toxin antitoxin. Apparently cancer does not differ. People have realized that there is hope for cancer if it is promptly and satisfactorily treated, and they have demanded adequate facilities.

In 1923-1925 the eighty-six hospitals had 228 beds in constant use by cancer patients. (Table III.) In 1928-1930 these same hospitals used 300 beds. In the earlier period these hospitals had seventy-one beds in constant use by patients who died in the hospital and in the later period eighty-three beds. The increase has been greater for those patients who left the hospital alive than it has been for those who died in the institution. The average stay of total patients has been about the same, being 20.3 days in the earlier period and 20.0 days in the later one; but the average stay of terminal patients has decreased from 35.9 days in 1923-1925 to 30.6 days in 1928-1930. There is a strong probability that the alleviatory action of radiation may be responsible for the shorter length of terminal stay inasmuch as these cases were not obliged to enter the hospital for the last time until a later period in the disease.

There has been an 11.9 per cent decrease in the number of operations for cancer patients in hospitals and 16.5 per cent decrease for those patients that died in hospitals following operation. This indicates that the surgeons are being more selective with operations and a large percentage of patients unable to withstand operations are not being subjected to them.

On the other hand, radiation has increased. In 1923-1925 radiation alone was received by 9.9 per cent of the hospital cases and in 1928-1930 by 16.0 per cent. There has been a decrease of 22.2 per cent in the patients receiving radiation alone that died in the hospital. All cases receiving both radiation and operation have been classified as operative cases and not radiation

TABLE III
HOSPITALIZATION OF CANCER

	Average 1923–25	Average 1928–30	Percentage Increase
Cancer deaths in Massachusetts	5,015	5,699	13.6
Hospital admissions	4,093	5,479	33.9
Terminal cases in hospital	725	992	36.8
Cases remaining in hospital over thirty days	223	280	25.6
Hospital days	83,027	109,205	31.5
Hospital days, terminal cases	26,054	30,462	16.9
Hospital days, over thirty, long time terminals	20,115	22,222	10.5
Per cent hospital admissions that died in hospital	17.7	18.2	2.8
Total beds in hospitals	10,166	10,818	6.4
Beds in constant use for cancer patients	228	300	31.5
Beds in constant use for cancer patients who left hospital alive	157	217	38.2
Beds in constant use for patients dying in hospital	71	83	16.9
Average stay in hospital, per patient	20.3	20.0	
Average stay per patient, terminal cases	35.9	30.6	
Average stay per patient, long time terminals	90.2	79.4	
Per cent of operations in hospital admissions	56.2	49.5	-11.9
Per cent hospital admissions that died in hospital with operation	7.9	6.6	-16.5
Per cent operated cases that died in hospital	14.1	13.3	- 5.7
Per cent of hospital admissions that received radiation (no operation)	9.9	16.0	61.6
Per cent radiated cases that died in hospital (no operation)	4.5	3.5	-22.2
Per cent hospital admissions that received neither radiation nor operation	33.9	34.5	.8

cases. In the earlier study 33.9 per cent received neither radiation nor operation while in the later study 34.5 per cent received neither. This again may indicate more selection.

TABLE IV
RADIATION (NO OPERATION)

	Average 1923–25	Average 1928–30	Percentage Increase
Buccal Cavity	16.8	30.5	81.6
Stomach	4.1	4.6	12.2
Intestines	7.0	5.7	-18.6
Female Genitals	23.7	30.8	29.9
Breast	7.8	15.8	102.5
Skin	24.5	17.5	-28.6
Others	10.3	13.5	31.0

The increase in radiation by location of cancer is shown in Table IV. The greatest increase is shown in cancer of the breast, with cancer of the buccal cavity second. The decrease in radiation in cancer of the skin is interesting as in this type of cancer radiation has much to offer. Female genitals and buccal cavity have higher radiation rates than any of the other types of cancer.

This study shows that individuals with cancer are more ready to enter hospitals for treatment than formerly; that the surgeons are handling these cases in a more approved manner; and while there is much to be hoped for in the cancer problem it seems reasonable to assume that the last five years have materially advanced the cancer situation in Massachusetts.

AVERTIN AS A BASAL ANESTHETIC*

BY FRANK WILLIAM MARVIN, M.D.†

AVERTIN as a basal anesthetic is now being used extensively by the profession throughout the United States and abroad, as is evidenced by the vast amount of literature recommending its use. It was discovered by Willstaetter and Duisberg during the reduction of bromal. Its first clinical application was by Butzengeiger in March nineteen hundred and twenty-six.

Tribromethanol, Avertin, or "E-107," is chemically ethyl alcohol with three bromine atoms introduced into the formula or C Br_3 CH_2 OH, and should be called tribromethyl alcohol or tribromethanol. Commercially it is supplied as Avertin Fluid which is a solution of tribromethanol in Amylene Hydrate (itself a narcotic), one cubic centimeter of which contains one gramme of the drug. Mouzon describes the new agent as "a white, crystalline powder which melts at a temperature between seventy-nine degrees and eighty degrees centigrade, fairly soluble in water, to the degree of two and five tenths per cent at twenty degrees centigrade, and to the degree of three and five tenths per cent at forty degrees centrigrade". At higher temperatures, these solutions partially decompose. A dibrome substance known as dibromacetaldehyd is produced, and hydrobromic acid is liberated. Solutions in alcohol lack stability at all temperatures. The same is true of old aqueous solutions, especially if they have been exposed to light. Hence it is necessary to keep the solution tightly corked in dark bottles, since it is sensitive to air, light, and heat.

The action of the drug is fairly rapid after injection into the rectum. It is absorbed by the intestinal mucosa more rapidly than the water in which it is dissolved. During the first twenty minutes eighty per cent is absorbed. Unconsciousness is produced more quickly and quietly than with any similar drug. No local irritation of the rectal mucosa has been observed from the use of a properly prepared and tested solution. Detoxication of tribromethyl alcohol occurs in the liver through the formation of a compound with glycuronic acid, the resulting product being eliminated by the kidneys. Eighty-one per cent of the drug in this combination was recovered from the urine within forty hours by Straub. During the same period Parsons found that seventy-two per cent of the bromine was excreted in the urine of the human being. Traces of bromine have been found in the perspiration, but not in the feces, or in the expired air.

Narcosis, amnesia, and partial or basal, and even complete anesthesia are produced by avertin. After absorption, it acts on the central nervous system as do the commoner anesthetics. Recent experimental work by Raginsky and Bourne at McGill University has shown that avertin anesthesia produced no deleterious effects upon the heart. Goldschmidt, using a Boas cardiotachometer, studied the heart rate during operations under different inhalation anesthesias and recently applied the same method using avertin as a basal anesthetic. These studies showed that the abrupt changes in heart rate produced by excitement at the beginning, and the end of the anesthesia, were markedly reduced, or practically absent. Its action on the blood vessels showed a fall in blood pressure due to peripheral action in all of the experiments. This lowering of the pressure ceased immediately following the administration of ephedrin, which caused the pressure to rise, and remain well sustained. Kennedy of England one year ago reported a series of one hundred and fifty cases, and concluded that no untoward results were observed.

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Lund and Taylor at the Huntington Hospital have just completed a series of two hundred and nineteen cases without fatality. They studied the blood pressure fall occurring in avertin anesthesia, and believe that avertin is contraindicated in operations, which, in themselves may give rise to considerable shock, and in patients who present any marked degree of hypertension. Extensive study by other investigators of its effect on the liver has shown that it is much the same as that of ether, and much less than in the case of chloroform. Repeated doses produced only a mild parenchymatous degeneration of the liver and kidneys. Other experimental work in which severe injury or removal of one or more organs (spleen, liver, kidneys, thyroid, and temporal lobe) has shown that the detoxication period has been affected but slightly. Specht found that hepatic and renal injuries are not, per se, contraindications to the use of tribromethyl alcohol, although he avoids it in cases of diffuse chronic or acute nephritis.

The respiratory center is influenced early, but the margin of safety is relatively great. The respiratory rate may decrease, but it is usually slightly increased, and often becomes shallow. Adequate means should be instituted at once should any respiratory embarrassment occur. We have never seen any respiratory failure or condition that required supportive methods. We believe that this is due to the fact that the drug has been administered carefully and conservatively so far as dosage is concerned.

The technique by which avertin is administered should be carefully observed. The method is simple when once mastered. The preparation and dosage of the drug are calculated on the body weight of the patient in kilogrammes. For example, a patient weighing seventy kilogrammes (one hundred and fifty-four pounds) should be given one hundred milligrammes per kilogramme body-weight. The dosage of avertin fluid would thus be seven grammes or seven cubic centimeters dissolved in two hundred and eighty cubic centimeters of distilled water. A five hundred cubic centimeter Erlenmeyer flask containing two hundred and eighty cubic centimeters of distilled water is heated in a water bath, or on a small electric stove to a temperature of forty degrees centigrade, when seven cubic centimeters of avertin fluid, accurately measured in a pipette are added. The mixture is shaken vigorously until all the globules of avertin fluid have disappeared. A few drops of a one to one thousand solution of Congo-red are now added to the contents in the flask, which is again shaken. If the color remains an orange-red, the solution is suitable for injection. It must be discarded if there is the slightest tinge of blue, which is indicative that the tribromethanol has decomposed, and hence is unsafe. The rectal injection is administered by gravity through a rectal tube at a moderate rate of flow. It is our custom to give the entire enema at one time.

The ease with which the anesthesia takes place is very striking. From three to ten minutes is the time required for unconsciousness, the average being seven minutes. At first the patient becomes very drowsy, stops talking, yawns a few times, and then falls asleep. Separation of the lips is first noticed with drooping of the lower jaw, accompanied by marked relaxation of these muscles, as well as those of the tongue and of the extremities. As the tongue frequently falls back in the throat, it must be carefully watched. Correction of this by the insertion of an airway at once removes any obstruction to the breathing, which should be generally quiet and regular. It is well to keep the patient's head low and on its side, thus avoiding respiratory difficulty and cyanosis. The skin is usually dry, pink, and warm without cyanosis. If the latter occurs, search for the cause, and correct it.

In regard to the eyes, first the conjunctival, and later the corneal reflex is abolished with the eyeballs fixed. The pupils react to light, but appear much contracted especially if a hypnotic has been given. There is an absence of nausea and excitement. The induction is unattended by salivation. The respiration is shallow, but regular. No change is noted in rate and character of the pulse. There is, however, a decided change in the blood pressure consisting of an initial drop of about twenty millimeters, this being the average in the series of cases that we have done. As a rule this pressure gradually returns to within normal limits. In some clinics, however, they report that the pressure remains lowered for two or three hours afterward. If the supplemental anesthetic has been nitrous oxide, the pressure generally remains normal. Should a persistent lowered pressure be recorded by the sphygmomanometer, it is well to administer ephedrin, which will cause a normal return of the pressure, and, in all probability, will be sustained.

The deep sleep and marked relaxation lasts usually for thirty to forty minutes, depending, of course, on the size of the dose, whereas the stage of anesthesia lasts for sixty to ninety minutes. For abdominal work, it is best to supplement with a little ether, nitrous oxide, or novocaine. This should be added before the actual surgery is commenced. Avertin anesthesia frequently produces relaxation sufficient for all minor operations, and sometimes even for major ones. Summing up the clinical appearance, we are led to believe that this type of anesthesia can be induced in an almost ideal manner. Certainly those who have experienced this form of anesthesia hold nothing but praise for it.

The following postoperative effects are noted. The patient leaves the table dry, pink, and

warm. The wet, clammy, pallid skin frequently noted after a long ether, spinal, or even local anesthetic is entirely absent. There is no nausea or vomiting, which next to the induction, is one of its outstanding desirable features. There is less postoperative distention and abdominal pain than after other general anesthetics. We have not yet seen or heard from a single patient who has complained of rectal irritation, nor has any sanguineous or mucous discharge from the bowel been recorded. Patients vary as to the length of sleep postoperatively. They generally return to consciousness as from a natural sleep soon after their arrival in bed, answer a few questions, and then fall asleep again. Some however sleep for several hours, especially if they have had narcotics. They retain no recollection of the sequence of events after the induction. This amnesia is another added feature worth mentioning. The amount of postoperative excitement has been so slight that we call it negligible. If restlessness occurs, it is controlled easily by a very small dose of one of the common sedatives. The absence of distressing postoperative vomiting cannot be emphasized too strongly. It is fair to assume that there will be a lower incidence of postoperative pneumonia than there is with ether. Very little ether is used with avertin, hence there is a minimum amount of irritation within the lungs as compared with straight ether inhalation.

This drug may be safely used in a large choice of operations, especially in those which require a long and light degree of anesthesia. Orthopedic and neurological surgeons will find it ideal, the latter especially in intracranial operations. It has filled a great void in pediatric surgery. Ophthalmic and aural surgery, psychiatry, and obstetrics all have their adherents. It has been used on many other occasions. At the New Haven Hospital two cases of tetanus were successfully kept free from convulsions by its use. It also has been given on the wards for painful treatments. Patients who have had it once prefer it to ether for subsequent operations. It can be used frequently on the same patient without any deleterious effects on physiological functions. Recently, an elderly man had avertin three times within a period of two weeks for an extensive plastic operation on the forehead and scalp. The unsuitable cases include the elderly, sclerotic, weak, especially the septic and starved individual. However, it has been used successfully in Cancer Clinics.

Communication with several clinics has shown that it was given in over three thousand cases at the Johns Hopkins Hospital. Since August 18, 1930 when we introduced it at the Presbyterian Hospital, New York City, there have been one thousand eight hundred and fifty-two avertin anesthesias up to January 1, 1932. At the New Haven Hospital it has been used as a basal anesthetic in two hundred and fifty-one surgical procedures, including one case of chorea, and two of tetanus mentioned above. In the Lakeside Hospital at Western Reserve University it has been used since April 22, 1930, one thousand and forty-two times. Other clinics give similar figures.

The death rate in avertin anesthesia is still an unsolved problem. Judging from statistics, the mortality is low. Over two hundred thousand cases have been reported without any fatalities. In the early use of the drug, death occurred due to its promiscuous administration by inexperienced men on poor risks, who received large doses resulting in toxic poisoning. Several pathologists have been consulted as to their findings at autopsy. These have been negative. No instances are given in the American literature reporting a mortality by intoxication. Contrary to this belief, it is our opinion that death is a toxic one. Too large a dose of the drug, or the synergistic action of too many other drugs used in combination with it, has caused the untoward results or fatalities. It is like any other anesthetic that is used, and we must accept its mortality. Statistics show, however, that the mortality is extremely low, when compared with the other commoner anesthetics in use today.

CONCLUSIONS

1. Avertin should be used only as a basal anesthetic.
2. It should be given only by a well-trained anesthetist or under his direction. Every detail of technique should be executed accurately. Carelessness will be penalized by morbidity and mortality.
3. It causes a peaceful, quiet, and rather rapid induction with early relaxation.
4. The amount of ether or nitrous oxide used as an adjunct is greatly reduced.
5. It should be used alone, and not in combination with other drugs whose synergistic action might produce serious complications.

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BLOOD PRESSURE FALL OCCURRING IN AVERTIN ANESTHESIA*

BY GRANTLEY W. TAYLOR, M.D.,† AND CHARLES C. LUND, M.D.†

DURING the last two years, at the Huntington Memorial Hospital, avertin anesthesia has been used cautiously in selected cases with a considerable degree of success and with great comfort to the patients. The series of cases has now reached 219 (October 1, 1931) without fatality. It seems desirable to present a brief summary of our experience in the use of the drug.

SELECTION OF CASES

We were particularly attracted to rectal administration of the anesthetic agent, because of the relatively large number of cases requiring operation about the mouth, face or neck. The increasing use of electrosurgical operations further stimulated our interest in a non-inflammable anesthetic. Finally, especially in the field of gynecologic cancer, an anesthetic of rather protracted duration offered increased comfort to the patient during a considerable part of necessarily long radium applications. The greater part of our operations done with avertin anesthesia have been of these types; the great majority has been of a sort not ordinarily associated with any evidence of surgical shock. The patients, almost without exception, had cancer and presented some degree of debility in consequence. The average age of the group (55.4 years) was greater than that of patients in a general surgical clinic. We have accepted the contraindications for avertin anesthesia commonly given in the literature, namely evidence of any considerable impairment of liver or kidney function.

TECHNIQUE OF ANESTHESIA

The preparation of the patient, in general, follows that ordinarily recommended. Preoperative medication of morphine, pantopon or luminal is used in practically all cases. The amylene hydrate solution of the drug known as "avertin fluid" is used in freshly prepared aqueous solution, in doses of 80 to 100 milligrams per kilogram of body weight. Supplementary anesthesia, usually nitrous-oxide oxygen, has been used in about 20% of the cases, in contrast to 80% to 100% in other clinics. This is in part due, perhaps, to the greater age and increased debility of these patients, in part also to the relatively minor character of many of the operations, and to the frequent lack of any necessity for muscular relaxation.

COURSE

An adequate surgical anesthesia usually develops within about ten minutes after administration of the drug. Frequently there is some response to the skin incision. The respirations are quiet and often rather shallow; the pulse rate is rarely accelerated; the color of the patient is good, as a rule, although cyanosis is sometimes observed. Great care must be exercised to preserve a clear airway. The skin remains dry and warm. The cough reflex remains active unless the patient has received morphine preoperatively.

Following operation the patient remains unconscious for a variable period, which averaged nearly three hours in the first 100 cases, although periods of six hours were not uncommon. Vigilant care to preserve an airway must persist until full consciousness returns. There has been no

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postoperative vomiting except in cases supplemented with ether inhalation. There is often some disorientation and amnesia on return of consciousness, which has persuaded us to use bed boards as a routine in all postoperative cases. Bladder function returns promptly, and the necessity for catheterization is very rare. Two patients in the first series of 100 developed pneumonia postoperatively. From our observations here and at other hospitals, we do not feel that avertin will be useful in reducing postoperative pulmonary complications.

THE BLOOD PRESSURE

Frequent observations of the blood pressure were made during the course of the operation and postoperative period. We were very much surprised to find a pronounced drop in nearly all of the cases. This supervened in some cases at once; in most, however, not until about an hour after induction. The literature mentions a fall of 10 to 20 m.m. as not uncommon. However, in our first fifty cases, with an average preoperative blood pressure of 125 m.m. systolic, 65 m.m. diastolic, the *average* postoperative pressure was 85 m.m. systolic, 45 m.m. diastolic! Usually the clinical state of the patient gave no intimation of this marked drop. It is noteworthy in this connection that the pulse pressure remained satisfactory, and that the ratio of pulse pressure to diastolic pressure showed very little disturbance. In a few cases, however, the patients showed a weak rapid pulse, depressed shallow respirations, pallor and cyanosis. Various supportive measures were invoked to meet this fall in blood pressure, the most effective of which seemed to be ephedrine, used either prophylactically or after the drop had occurred. The response to a single dose has been prompt, and there is no tendency for a secondary drop to occur after the ephedrine action has worn off*.

It seemed important to study this fall in blood pressure to learn if it was in any way related to surgical shock, although the ready and lasting response to ephedrine seemed to show that it was not. Aub and Cunningham[1] have shown that in shock the venous oxygen content was greatly reduced, due to the stasis of a large part of the blood in the capillary and venous bed. The degree of shock correlated well with the amount of fall of venous oxygen; a reduction to 2 to 4 volumes per cent of venous oxygen was constantly observed in severe shock. In all the copious literature of avertin the fall in blood pressure has been studied very little and we do not believe this particular point has been considered at all†.

*In a series of twenty-five cases in which ephedrine was used prophylactically, the preoperative blood pressure again averaged 125 m.m. systolic and 65 m.m. diastolic. In this series the postoperative blood pressure averaged 110 m.m. systolic and 60 diastolic.

†A good review of the avertin literature with nearly 200 references may be found in an article on the subject by Lundy[2].

METHODS OF ANALYSIS

In every instance the blood was taken from the cubital vein, without stasis, into an oiled syringe and delivered at once into a test tube under oil. Heparin was the anti-coagulant. The determination was made on the whole blood by the method of Van Slyke and Neill[3].

RESULTS

TABLE

Patient	Initial B. P. Systolic	Systolic B. P. when blood taken	Total Fall in m.m. Hg.	Pulse when blood taken	Respirations when blood taken	Venous O Content Vols. %
I	?	80	?	?	?	12.85
II	138	118	20	92	26	14.85
III	120	80	40	82	18	12.53
IV	100	70	30	118	18	13.35
V	140	72	68	60	18	10.30
VI	120	38	82	72	18	11.03
VII	140	80	60	80	18	12.22
VIII	125	58	67	88		11.39
IX	110	70	40	64	24	15.06

DISCUSSION

Inasmuch as these venous oxygen figures are all within normal limits, it seems obvious that the circulatory collapse here described is not due to surgical shock. It is reasonable to assume, on the basis of the prompt and uneventful recovery made by these patients, and the response to ephedrine, that the condition is considerably less grave than surgical shock. It must be obvious, however, that such a marked fall in blood pressure is potentially dangerous. For our own protection we have considered this type of anesthesia contraindicated in operations which, in themselves, give rise to considerable shock, and in patients who present any marked degree of hypertension. Disasters following the use of avertin in other hospitals may be explainable on the basis of failure to observe these contraindications. We recommend the drug very guardedly and only for those cases in which a rectal anesthesia is strongly indicated.

SUMMARY

A brief résumé is presented of our clinical experience with avertin anesthesia at the Huntington Memorial Hospital, with special reference to the fall in blood pressure commonly observed.

Data are presented showing that the venous oxygen content remained within normal limits in nine patients who had a marked fall in blood pressure during an anesthesia in which avertin played an important part.

We wish to thank Miss Myra Lee, the anesthetist of the hospital, for her help in collecting the clinical data, and Miss Hilda M. Holton, B.S., for technical assistance.

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THE BILL TO REGISTER CHIROPRACTORS*

BY STEPHEN RUSHMORE, M.D.†

THE object of the bill is to regulate the use of chiropractic in Massachusetts by establishing a separate board for the registration of chiropractors. Regulation already exists under the present medical practice act but the use of chiropractic in the treatment of disease is now restricted to duly qualified and licensed physicians.

The question at issue before this Committee on State Administration is one of administrative procedure, and the chiropractors are asking that the administrative policy of the state be changed. Furthermore, the question at issue concerns administrative policy only, and any alleged merits or demerits of chiropractic as a system of treatment of disease, however important in deciding the final value of the system, have no bearing on this question of policy. I shall, therefore, limit my discussion to the question of administration.

What is this thing that is to be regulated? The common-sense definition of chiropractic as found in the dictionary is that it is a drugless system of treating disease, the details of which do not concern us now. It is in fact, a part of the practice of medicine. What part it is, whether a good part or a bad part, is irrelevant; but decisions of state courts and of the Supreme Court of the United States also affirm chiropractic to be part of the practice of medicine.

I had intended to say nothing of the details of the bill, considering only the principles involved, but there is one detail I cannot forbear to mention. It is the definition of chiropractic contained in Section 87 T. "Chiropractic or the system, method or science commonly known as chiropractic for the purposes of this act shall have the following meaning, namely the science or practice of locating and adjusting by hand the malpositions of the articulations of the human spine."

As the late Theodore Roosevelt might have said "Those are weasel words." Is that what the chiropractor wants? Give him a human spine and see if he will be satisfied. He wants a spine that is surrounded by muscles and nerves and blood vessels and covered by skin; that is part of a human body and, moreover, the body must be alive. What he wants, of course, is a patient who is sick. If what he really wants is to treat persons who are sick, why does he not say so in straightforward and manly fashion? Weasel words, indeed.

The principles embodied in chiropractic may be called a system or school of medicine. In this connection, I call your attention to Chapter 112, Section 7 of the General Laws of Massachusetts, which reads as follows: "The five preceding sections and section eight shall not be held to discriminate against any particular system or school of medicine." The statute specifically forbids discrimination against any system or school. By the same token, it forbids discrimination in favor of any school or system, for what is in favor of one is against the others. Yet it is discriminatory class legislation in favor of themselves that the chiropractors are asking, something in violation of the spirit of our constitution, incompatible with the policy laid down in the statute and contrary to the practice that has been adopted. This policy is that all persons who are to be recognized and registered as qualified practitioners of the healing art, as physicians, in Massachusetts shall appear before a single board of examiners, fulfill a single group of qualifications, pass a single group of examinations.

This policy, which I trust the State will never be persuaded to give up, is to be justified on at least two grounds, which I shall discuss. The first justification is to be found in the nature of the work of the physician. The functions of the Board regulating the work of the physician fall under two heads—to license physicians and to unlicense physicians. In Chapter 112, Section 61, pertaining to the unlicensing of the physician there occurs as a ground for revocation of the license, "gross misconduct in the practice of his profession". There is no definition of professional conduct or misconduct so that we have to look outside the law for what the statute has in mind. It is important to note that the law does not here create, it merely recognizes something already existing, existing as it were in the nature of things, in the relation of physician and patient. For in a very real

*Argument before the State Administration Committee of the Massachusetts Legislature.

†Rushmore—Secretary of the Massachusetts Board of Registration in Medicine. For record and address of author see "This Week's Issue," page 644.

and significant sense, the patient who goes to a physician puts himself in the power of the physician, and a kind of trusteeship is created. We know how scrupulous the state is to see that there is no violation of trusteeship, and this is the deeper significance of what for brevity we speak of as the single standard. The State has refused to tolerate a lower standard of qualification for this trusteeship. It has insisted that all persons who wish to be recognized as qualified to enter upon this trusteeship shall have fulfilled this single group of qualifications which the State has established.

The second ground of justification for this administrative policy is to be found in the history of the medical sects, for chiropractic is a medical sect. A medical sect centers about an idea, some theory concerning the cause of disease and some theory concerning the method of treatment. The idea may be old or it may be new, but generally it concerns some point not emphasized in current medical thought or practice. The characteristic of the sect is that it is exclusive. The founder of the sect and the first sectarians deny the correctness of any other theory as to the cause of disease, and the soundness of any other method of treatment. Sometimes a sect starts as a real or alleged reform in medicine, and then the missionary zeal of the self-appointed reformers carries all before it, if the enthusiasts are to be believed. But soon the public and the sectarians find that the method does not work quite so well as at first, is not competent to accomplish so much as was claimed at first, and recourse is had to other therapeutic procedures. These procedures represent an approximation toward scientific medicine. It is well for humanity that this inevitable change occurs, but as soon as the exclusiveness weakens, the sect as a sect begins to disintegrate and eventually dies.

As illustrations of what happens to medical sects, four examples may be cited, homeopathy, eclecticism, osteopathy, chiropractic. Everybody knows that in spite of a substantial contribution to the stream of medicine, homeopathy as a sect is nearly gone. We have among us estimable physicians who profess and practice homeopathy. They are intelligent, well trained, skilful in diagnosis and treatment. If we look for schools in which homeopathy is taught, however, and for students who are devoting themselves to homeopathy, we realize how serious has been the decline of the sect.

Of eclecticism it may be said that as a power in medicine it has passed away.

Osteopathy, a newer sect, is running the same course, and the chief sign here of the change is the admixture of scientific medicine which is found in the best osteopathic schools, and the efforts toward closer approximation to scientific medicine.

It remains to show that chiropractic is going the way of all sects. Chiropractic was formally born, or discovered or invented in this country in 1895. It flourished most luxuriantly from 1916 to 1923. In 1920, there were 79 schools, one of which had two thousand students and an income estimated at over a million dollars a year. Now that school has three hundred students. In 1927, there were forty schools and two thousand students. A more recent study shows twenty-one active schools, and about fourteen hundred students. If the fountain head is drying up, the stream will soon disappear. Here, too, the inevitable dilution with other therapeutic methods proceeds apace.

The history of the medical sects is always the same story: a period of expansion, of inflation, such as we had in financial matters in 1927. Inevitably come disillusionment and deflation, such as we are having now. However, there is this to be noted. Depression is always followed by prosperity, so that if we are fortunate enough to survive, we reasonably expect prosperity. But no medical sect has ever staged a comeback. When it is flat, it is flat forever. The ideas are eternal and they endure, but when emphasis is again placed upon them, we have a new name for them and a new sect.

It would be unwise administration to set up a separate board of registration for a medical sect even if it gave great promise of a reform in medicine; much more so, if the sect is shrinking so rapidly as is chiropractic, on which as a sect the hand of death is already visible.

It may be said—"If sects die a natural death, why not give each one its board and let it run its course?" In the first place, that procedure is wasteful, there are fifty sects at least, and new ones come up all the time. To give any sect its own board is to establish a bad precedent. In the second place, while sects may die a natural death, boards do not. A piece of machinery once set up is difficult to destroy, and the experience of the neighboring state of Connecticut, with its eclectic board and the diploma mill scandal, may well make Massachusetts hesitate to change the policy which has been found to be good.

We trust that the state will never change its policy of requiring that all persons who are to be recognized by it as qualified to accept the responsibilities of the practitioner of the healing art, shall fulfill a single group of qualifications.

MORTALITY AND EXPECTATION OF LIFE IN MENTAL DEFICIENCY IN MASSACHUSETTS: ANALYSIS OF THE FOURTEEN-YEAR PERIOD 1917-1930

BY NEIL A. DAYTON, M.D.,† CARL R. DOERING, M.D.,† MARGARET M. HILFERTY, A.B.,† HELEN C. MAHER, A.B.,† AND HELEN H. DOLAN, S.B.†

[*Continued From Page 570, Issue of March 17*]

CAUSES OF DEATH IN IDIOTS, IMBECILES AND MORONS

We now wish to turn to the percentage distributions within the different mental status groups. Table XIII gives the percentage distribution of certain causes of death among idiots, imbeciles and morons. This table is arranged in order of frequency. That is, the disease presenting the highest percentage, influenza, is placed first on the table, and the disease presenting the lowest percentage, diphtheria, is placed last. We wish to study at this time whether or not there is any evidence that certain diseases attack any particular group. That is, is there any evidence that influenza, for example, is of more importance as a cause of death among idiots than among morons? As we study this table we note that the diseases fall into four classifications in accordance with the percentages involved in the different mental status groups. These are as follows:

(a) Diseases in which the percentages present an upward trend as the higher mental levels are approached and present the highest percentage among the morons. Diseases in this group are: influenza, nephritis and cerebral hemorrhage.

(b) Diseases in which the percentages present a downward trend as the higher mental levels are approached, and present the highest percentage among the idiots. Diseases in this group are bronchopneumonia, epilepsy, diarrhea and enteritis.

(c) Diseases presenting the highest percentage among the imbeciles. Diseases in this group are lobar pneumonia, diseases of the heart and circulatory system, and malformations.

(d) Diseases in which the percentages for the three mental groups do not vary greatly from each other. Diseases in this classification are tuberculosis of the lungs and other forms of tuberculosis.

Here we have, then, an outline of the diseases which are supposed to attack individuals in the various mental groups. For the moment, accepting this explanation, it appears that bronchopneumonia, epilepsy and diarrhea have a selective action in the case of idiots, and that influenza, nephritis and cerebral hemorrhage have a preference for the morons. As we view this material, however, the thought intrudes itself

TABLE XIII

CAUSES OF DEATH COMPRISING MORE THAN 1 PER CENT. OF THE TOTAL DEATHS, BY MENTAL STATUS GROUP

	Percentage of Total Deaths								
	Idiots			Imbeciles			Morons		
	T.	M.	F.	T.	M.	F.	T.	M.	F.
Influenza	16.1	17.1	14.6	15.6	17.4	12.6	19.2	24.0	15.8
Tuberculosis of Lungs	14.9	17.6	11.1	12.9	9.9	16.8	15.4	9.2	19.8
Bronchopneumonia	12.4	9.0	17.4	7.0	7.5	5.9	2.3	—	4.0
Lobar Pneumonia	6.5	7.6	4.9	9.7	9.9	9.2	4.6	7.3	2.6
Heart and Circulatory	2.8	2.8	2.7	9.7	9.3	10.1	6.2	5.5	6.6
Epilepsy	7.0	5.2	9.7	1.7	2.3	.9	2.3	1.9	2.6
Diarrhea and Enteritis	5.1	4.7	5.6	4.5	5.8	2.5	.8	—	1.3
T. B. Other Than Lungs	4.2	5.7	2.0	3.9	3.5	4.2	4.6	5.5	4.0
Other General Diseases*	3.4	1.9	5.6	2.4	1.7	3.4	4.6	9.2	1.3
Acute and Chronic Nephritis	.3	.5	—	3.5	2.3	5.1	6.2	5.6	6.6
Cerebral Hemorrhage	1.1	1.4	.7	2.4	1.2	4.2	3.1	1.9	4.0
Malformations	2.0	2.4	1.4	2.4	2.9	1.7	—	—	—
General Paralysis	.6	.9	—	1.7	—	4.2	1.5	3.7	—
Diseases of Spinal Cord	.8	.5	1.4	1.0	1.7	—	1.5	3.7	—
Diphtheria	1.7	.9	2.8	.7	1.2	—	—	—	—
Causes of Death Unknown†	1.6	1.4	2.0	3.5	4.2	2.5	13.0	3.7	19.7
Other Causes	19.5	20.4	18.1	17.4	19.2	16.7	14.7	18.8	11.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Status Lymphaticus, Pyemia, Malnutrition of Idiocy, Pernicious Anemia, Septicemia, Diabetes Insip., Addison's Disease, Leukemia.

†Patient died while out of institution on visit or escape. Cause of death could not be obtained.

†Dayton, Doering, Hilferty, Maher and Dolan—For records and addresses of authors see "This Week's Issue," page 644.

that we are not viewing diseases which have a specific action upon certain mental groups, but we are viewing the causes of death which might be expected to operate within certain ages. We know that idiots die at comparatively young ages and that it is not unreasonable to expect that diarrhea and bronchopneumonia would be prominent causes of death at these ages. Again we know that morons have lower death rates in the younger age groups and that, consequently, they survive to higher ages. This appears to be borne out in the diseases assuming the most prominent position as causes of death among the morons. Certainly influenza, nephritis and cerebral hemorrhage are diseases of the higher age groups and not of the younger age groups. However, we will have to postpone exact information on this matter until we consult a later section based upon death rates for certain diseases within the different age groups with population comparisons.

There are no marked sex differences in the material outlined in Table XIII. We notice that the males dying of influenza exceed the females in all three mental groups idiots, imbeciles and morons. The percentage excess of males over females among the idiots is 3 per cent., among the imbeciles 5 per cent., and among the morons 9 per cent. The percentage of males dying with lobar pneumonia also exceeds the females in all three mental status groups. The percentage excess of males over females among the idiots is 3 per cent., among the imbeciles .7 per cent, and among the morons 5 per cent. The other diseases, however, are rather scattered, favoring one sex among idiots and another among the imbeciles and morons, or vice versa. While fairly large sex differences appear in some of the mental status groups, these differences are not sufficiently large to warrant further discussion.

TABLE XIV

CAUSES OF DEATH IN MASSACHUSETTS STATE SCHOOLS, 1917-1930, COMPARED WITH OTHER STUDIES: PERCENTAGE DISTRIBUTIONS

	Mass. (Dayton)	U. S. Census Report: 1923 (Pollock et al.)	Elwyn, Pa. (Barr)	Earlswood, Eng. (Tredgold)
Influenza	16.2	4.5	—	—
T. B. of Lungs	14.3	18.0	19.3	39.6
T. B. Other than Lungs	4.0	3.0		
Bronchopneumonia	8.9	7.6	14.2	10.4
Lobar Pneumonia	6.8	5.8		
Heart	6.0	9.4	5.6	4.9
Epilepsy	4.4	16.3	16.3	17.7
Diarrhea	4.0	5.4	(See "Digestive System" below)	(See "Digestive System" below)
Measles	3.4	1.5	—	2.4
Other General Diseases	3.1	1.7	—	—
Nephritis*	3.1	2.8	.9	1.1
Cerebral Hemorrhage	1.9	2.0	(See "Nervous System" below)	(See "Nervous System" below)
Malformations	1.8	—	—	--
Diphtheria	1.3	.1	—	1.6
General Paralysis	1.0	.3	—	--
Diseases of Spinal Cord	1.0	.6	(See "Nervous System" below)	.3
Cerebrospinal Meningitis	.8	—	6.7	5.3
Ill-Defined or Unknown	4.4	.5	—	—
Epidemic, Endemic and Infectious Diseases (Section I)	42.0	31.6	26.3	47.9
Diseases of Nervous System (Section III)	10.0	23.3	35.3	23.6
Diseases of Digestive System (Section VI)	8.1	8.0	17.4	4.3

*Acute Nephritis, Chronic Nephritis and Other Diseases of Kidneys.

CAUSES OF DEATH IN MENTAL DEFICIENCY IN MASSACHUSETTS COMPARED WITH OTHER AVAILABLE STUDIES

In the foregoing we have seen that certain diseases are outstanding as causes of death in Massachusetts State schools. At this point we may ask how these figures compare with those of other available studies. Table XIV presents this material, and gives percentage distributions of causes of death in the Massachusetts group and also in three other studies. These studies

are (1) The U. S. Census Report on Feebleminded, 1923, (2) report by Barr on deaths at Elwyn, Pa., (3) report by Tredgold on deaths at Earlswood, England. While these figures are for different periods and the nomenclature of diseases has changed slightly, they are suitable for a rough comparison. The numbers presented by the different studies do not vary greatly. The Massachusetts study presents 878 cases, the Elwyn study 625 cases, the Earlswood study 1,001 cases, and the Census Report a total of 1,347 cases. The Massachusetts study and the Census study are more readily comparable in the matter of nomenclature. They are not as comparable in the matter of time, however, since the Massachusetts study covers a period of fourteen years, between 1917 and 1930, while the Census report covers a single year, that of 1922. The Elwyn and Earlswood reports also cover a period of years. Consequently, the total percentage for specific diseases should not be subject to fluctuations introduced by death rates which simply happened to be high in one disease for a specific year. This condition could not be avoided in the Census study of a single year.

In reviewing the material presented by this table, the discussion will be confined to diseases which present material in all groups. We note that there is considerable agreement in the three American reports on tuberculosis (all forms). The Massachusetts study assigns 18.3 per cent. to this disorder, the Elwyn study 19.3 per cent., and the U. S. Census Report 21 per cent. Tredgold's report, however, shows that 39.6 per cent. of deaths at Earlswood were assigned to this cause. Pneumonia caused 15.7 per cent. of deaths in the Massachusetts study, 13.4 per cent. in the Census study, 14.2 in the Elwyn study, and but 10.4 in the Earlswood study. Diseases of the heart caused 6 per cent. of deaths in Massachusetts, 5.6 per cent. of deaths in the Elwyn study, 9.4 per cent. in the Census study, and 4.9 per cent. in the Earlswood study. As regards epilepsy we see an unusually small proportion of deaths in the Massachusetts study, a proportion of 4.4 per cent. In the Elwyn group epilepsy caused 16.3 per cent. of deaths, in the Census study of 16.3 per cent., and in the Earlswood study 17.7 per cent. It is difficult to account for these marked differences.

It has been the administrative policy in Massachusetts for some years to restrict the admission of epileptics to State schools and also to transfer cases already within the school to another institution which deals with epileptics only. This has probably cut down the number of deaths from epilepsy within State schools. That is, we may say that all of our cases have been actual cases of *epilepsy plus mental defect* and have not been simple cases of epilepsy without defect or cases in various degenerative phases which might simulate mental defect.

There are no great differences observed in nephritis, which makes up 3.1 per cent. of the Massachusetts study, .9 per cent. of the Elwyn study, 2.8 per cent. of the Census study, and 1.1 per cent. of the Earlswood study.

There were so many gaps in classification that it was thought advisable to group certain of these diseases into the main section number of the International List under which they occurred. This has been done in the lower half of Table XIV. Thus, when we consider Section I, *Epidemic, Endemic and Infectious Diseases,* we observe that the Elwyn group presents the smallest proportion dying from these causes*, a percentage of 26.3. The Census Report covering the entire United States for one year has 31.6 per cent. of causes under this heading. There is a decided jump to 41.5 per cent. for the Massachusetts study, and the proportion in the English group is even higher, a percentage of 47.9†.

When we consider *Diseases of the Nervous System* (Section III) we note that these causes of death constitute 10.3 per cent. in the Massachusetts study, 35.3 per cent. in the Elwyn study‡, 23.3 per cent. in the Census report and 23.6 per cent. in the Earlswood study. Again it is thought that the retention of epilepties within the Elwyn, U. S. Census and the Earlswood groups to a certain extent elevates these totals for deaths under the heading of "Nervous Diseases." At the same time the Elwyn report is unusually high in deaths from this cause, presenting nearly three-and-a-half as many deaths as the Massachusetts group.

Diseases of the Digestive System, considered as a group under Section VI of the International List, make up 7.9 per cent. of deaths in the Massachusetts group, 17.4 per cent. of deaths in the Elwyn group, 8.0 per cent. in the U. S. Census report, and 4.3 per cent. in the Earlswood group. In this group Tredgold's study presents the smallest number of deaths from digestive disorders and the Elwyn group presents the largest percentage. The Massachusetts study and the Census study occupy an intermediate position.

The most striking difference noted in this material is the unusually high number of deaths from tuberculosis within the English group. The percentage of 39.6 in the Earlswood study is so far above the American figures of 18.3 per cent. in the Massachusetts study, 19.3 per cent. in the Elwyn study, and 21 per cent. in the Census report, that time might well be devoted to determining the reason for this marked difference. The low proportion of deaths from epilepsy in the Massachusetts study is also

*Acute Infectious Diseases. From Barr's table this is made up by adding Acute Infectious Diseases and Phthisis.

†This total is arrived at by adding I. Zymotic Diseases and Tuberculosis.

‡This includes Diseases of the Nervous System, Meningitis and Epilepsy.

worthy of comment. The possible reasons for this, however, have been discussed. There may be other factors worthy of study in this connection. The Massachusetts group presents a high proportion of diseases grouped under the classification *Epidemic, Endemic and Infectious Diseases.* The Elwyn and Census groups present a lower proportion, while the English group presents a higher percentage, 47.9 per cent.

There are so many elements concerned in these differences that it is practically impossible to come to any definite conclusions.

CAUSES OF DEATH IN MENTAL DEFICIENCY COMPARED WITH THE SAME CAUSES IN THE MASSACHUSETTS POPULATION

In previous sections we have made comparisons between death rates among the various mental status groupings and the Massachusetts population. This gives us a rather rough approximation of the significance of death rates in mental deficiency. In another section we discussed the different causes of death and their relative importance in the specific mental status groups. At this point we wish to go a little further and compare death rates for specific causes within our group and rates for the same diseases in the Massachusetts population. In so far as the group studied consisted of deaths occurring during the years 1917-1930 inclusive it became necessary to study deaths occurring in Massachusetts for the same period of years and for the same causes.

From the Vital Statistics Reports of Massachusetts we obtained this material for the years 1917-1929 inclusive*, studying the causes of death by the main groupings of the International List and also by individual diseases. From these Vital Statistics Reports we added together the deaths from each specific cause by age groups, and for each year of the fourteen-year period. We then calculated an annual average number of deaths for each disease in the various age groups. For the population exposed to chance of death we used the population age groups for the median year of 1923. The resulting rates were then applied to the person-years available in our material on mental defectives. *Thus, we were able to determine the expected number of deaths which would have occurred in our group of mental defectives had the Massachusetts population death rates been applied.* In other words, we determined the number of deaths which we could have expected under various causes had our group been a general population sample and not a group of mental defectives. To illustrate, we determined the number of deaths from measles that would have occurred between the ages of 2 and 9 years, 10-19 years, 20-29 years, etc., had our group been a sample of the State population. We had for comparison the actual number of deaths which did occur from measles in our feebleminded group for the same age periods. Thus, we were able to compare the *expected* number of deaths from measles based on population rates with the *observed* number of deaths from measles actually occurring in our group of mental defectives. This method afforded a reliable basis of comparison. For example, if we found that, based upon the population, the number of deaths which we might expect in our 2-9 year group was 10 persons, and then found that the actual number of deaths in the same age group was 50 persons, we could say that measles appeared to be of greater significance as a cause of death in mental deficiency than in the Massachusetts population.

It should be understood, of course, that with the possible exception of one or two groupings, the numbers involved are rather small. The small numbers make it necessary that the significance of the resulting ratios be considered rather conservatively.

EXPECTED AND OBSERVED DEATHS AMONG MENTAL DEFECTIVES GROUPED IN ACCORDANCE WITH CERTAIN MAIN SECTIONS OF THE INTERNATIONAL LIST

In this and following sections we will make a comparison between the observed and expected deaths in certain main groupings of the International List and certain specific diseases in accordance with the method outlined in the preceding section. It is hoped that this method will give us definite information as to diseases or rather types of diseases which are of special significance in mental deficiency.

Table XV gives this information for certain groupings of the International List. The groupings included are I. *Epidemic, Endemic and Infectious Diseases,* III. *Diseases of the Nervous System,* IV. *Diseases of the Circulatory System,* V. *Diseases of the Respiratory System,* VI. *Diseases of the Digestive System,* and VII. *Non-Venereal Diseases of the Genito-Urinary System.*

In this analysis we have not included a discussion of the other main sections: II. *General Diseases,* IX. *Diseases of the Skin,* X. *Diseases of the Bones,* XI. *Malformations,* XIV. *External Causes,* XV. *Ill-Defined Causes.* They were not included because of the fact that the numbers were not sufficiently large to give satisfactory results.

For obvious reasons we have also not considered the following sections: VIII. *The Puerperal State,* XII. *Early Infancy,* XIII. *Old Age.* Arbitrarily, we have excluded the groups mentioned and have studied only the groups

*At the time of writing this paper the Vital Statistics Report for Massachusetts for the year 1930 was not available. Consequently, the averages are based on 13 years instead of 14. The error introduced through lack of material for this one year is probably not sufficiently large to influence the final results.

which would enable us to make rather conservative conclusions in reference to this particular part of the work.

Table XV presents three lines of figures for each group of diseases. The first line titled "Expected" gives the expected number of deaths within the various age groups. These are the number of deaths which we could expect within our group of mental defectives if the death rates of the Massachusetts population were applied. The second line titled "Observed" gives the actual number of deaths occurring from this particular group of diseases in our group of mental defectives and for the period studied. The third line titled "Ratio" gives the ratio between the observed and expected number of deaths. For example, in Section I, *Epidemic, Endemic and Infectious Diseases,* in the age group 2-9 years, we found that the expected number of deaths was 5 while the observed number of deaths was 64. When we calculate the ratio we obtain the figure of 12.8 and are then able to say that we had 12.8 times as many deaths among mental defectives for the causes included in grouping I. as would have been the case in the general population. For the convenience of the reader a condensed table demonstrating these ratios is here inserted (Table XVI).

We have arranged this table in the order of importance of the various groupings. That is, the grouping presenting the highest ratios between the observed and expected number of deaths tops the list, and the grouping present-

TABLE XV

DEATHS IN CERTAIN MAIN GROUPINGS OF THE INTERNATIONAL LIST OBSERVED AMONG THE FEEBLEMINDED (IDIOTS, IMBECILES AND MORONS) AND THE NUMBER EXPECTED ACCORDING TO SPECIFIC RATES FOR MASSACHUSETTS POPULATION

Groupings of International List	Deaths	Age Groups 2-9	10-19	20-29	30-39	40-49	50-59	Total 2-59 Years
I. Epidemic, Endemic and Infectious Diseases	Expected	5.0	17.2	26.4	11.3	4.7	2.2	68.8
	Observed	64.0	106.0	115.0	47.0	21.0	4.0	357.0
	Ratio	12.8	6.1	4.3	4.1	4.4	1.8	5.2
III. Diseases of the Nervous System	Expected	0.7	2.8	2.0	1.6	1.7	1.7	10.5
	Observed	20.0	19.0	12.0	9.0	11.0	7.0	77.0
	Ratio	28.6	6.7	6.0	5.6	6.4	4.1	7.3
IV. Diseases of the Circulatory System	Expected	0.6	5.6	4.0	3.0	3.0	3.1	19.3
	Observed	2.0	17.0	11.0	11.0	3.0	2.0	46.0
	Ratio	3.3	3.0	2.7	3.6	1.0	.6	2.3
V. Diseases of the Respiratory System	Expected	2.0	5.0	8.7	4.6	2.1	1.3	23.7
	Observed	48.0	48.0	22.0	9.0	11.0	9.0	147.0
	Ratio	24.0	9.6	2.5	2.0	5.2	6.9	6.2
VI. Diseases of the Digestive System	Expected	1.2	4.1	3.0	1.9	1.3	0.8	12.3
	Observed	14.0	17.0	10.0	8.0	10.0	4.0	63.0
	Ratio	11.6	4.1	3.3	4.2	3.3	5.0	5.1
VII. Non-Venereal Diseases of the Genito-Urinary System*	Expected	0.2	1.4	1.7	1.5	1.5	1.2	7.5
	Observed	2.0	8.0	7.0	5.0	1.0	—	23.0
	Ratio	10.0	5.7	4.1	3.3	.6	—	3.0

*Acute and Chronic Nephritis.

TABLE XVI

RATIOS BETWEEN EXPECTED AND OBSERVED NUMBER OF DEATHS IN MENTAL DEFECTIVES FOR CERTAIN MAIN GROUPINGS OF THE INTERNATIONAL LIST: ARRANGED IN ORDER OF IMPORTANCE

	Ratios Age Groups 2-9	10-19	20-29	30-39	40-49	50-59	Total 2-59 Years
III. Diseases of Nervous System	28	6	6	5	6	4	7
V. Diseases of Respiratory System	24	9	2	2	5	6	6
I. Epidemic, Endemic and Infectious Diseases	12	6	4	4	4	1	5
VI. Diseases of Digestive System	11	4	3	4	3	5	5
VII. Non-Venereal Diseases of G.-U. System*	10	5	4	3	6	—	3
IV. Diseases of Circulatory System	3	3	2	3	1	6	2

*Acute and Chronic Nephritis.

ing the lowest ratio is placed last. It must be recalled that many sections of the International List are missing and they comprise sections in which a small number or no deaths were reported.

When we consider the deaths by systems as outlined in Table XVI we observe that *Diseases of the Nervous System* present the highest ratio, that of 7 for all age groups 2-59 years; *Diseases of the Respiratory System* are in second position with a ratio of 6; *Epidemic, Endemic and Infectious Diseases* and *Diseases of the Digestive System* present ratios of 5 each; *Non-Venereal Diseases of the Genito-Urinary System* present a ratio of 3, and *Diseases of the Circulatory System* a ratio of 2. It is interesting to observe that, considered as groups, the diseases which have been assumed to hold such a prominent position as causes of death in mental deficiency, that is, diseases of the heart and infectious diseases, do not occupy the high positions previously attributed to them. This method of analysis brings out the fact that diseases of the nervous system and of the respiratory system are of the greatest significance in mental deficiency.

An inspection of the ratios within the various age groups also provides enlightening information. In all of the groupings except that of *Diseases of the Circulatory System* we see unusually high ratios in the age group 2-9 years. In *Diseases of the Nervous System* the ratio between expected and observed number of deaths is 28 for the age group 2-9 years. This drops to a ratio of 6 in the age group 10-19, and the same ratio is preserved rather well for the remaining decades. In *Diseases of the Respiratory System* we observe a ratio of 24 in the age group 2-9 years. This drops to a ratio of 9 in the age group 10-19 years, and still further to a ratio of 2 in the group 20-29 years. In the *Epidemic, Endemic and Infectious Diseases* we note a ratio of 12 in the age group 2-9 which drops to a ratio of 6 in the age group 10-19 years. In *Diseases of the Digestive System* the age group 2-9 years presents a ratio of 11 which drops to 4 in the age group 10-19 years. Approximately the same relative proportions are observed in Diseases of the Genito-Urinary System. Diseases of the Circulatory System present the only marked variation from this general rule. Here we observe a ratio of 3 for the age group 2-9 years and the same ratio in the age group 10-19 years. In fact, this group presents a remarkable uniformity for the ages 2-39 years. The observed deaths practically equal those of the expected for the age group 40-49 years, and are decidedly greater than the population for the age group 50-59 years. This group of diseases, which the literature of mental deficiency has stamped as one of the most important causes of death in mental deficiency, presents the lowest ratio of any of these systems, a ratio of 2 for the entire age grouping of 2-59 years.

If all of the ratios in all disease groups are considered together, the ratios for the age group 2-9 years are approximately 15. The ratio for the age group 10-19 years is approximately 5, and for the remaining decades the ratios are 3 or less. These facts bring out the tremendous significance of high death rates in the earlier years of mental deficiency. The mental defective appears to be subjected to an unusually high death rate in the first twenty years of life, particularly in the first decade of life. It is very important that we understand the economic and social significance of this early removal of the mental defective in this manner.

EXPECTED AND OBSERVED DEATHS AMONG MENTAL DEFECTIVES FOR CERTAIN DISEASES

In the preceding section we made a comparison between the observed and expected number of deaths in mental defectives for certain main groupings of the International List. We now wish to proceed to apply this same method of comparison to certain specific diseases which are of sufficient importance numerically to warrant consideration. In this part of the analysis we have considered the following diseases as they have presented numbers sufficiently large to allow a distribution into age groups. The deaths from these diseases are as follows: Infectious Diseases (measles, whooping cough, scarlet fever, diphtheria)—45 cases; Influenza—127 cases; Tuberculosis of Lungs—110 cases; Tuberculosis—Total All Types—142 cases; Epilepsy—33 cases; Diseases of the Circulatory System—46 cases; Bronchopneumonia—67 cases; Lobar Pneumonia—57 cases; Diarrhea and Enteritis—32 cases; Nephritis—19 cases.

The groups mentioned comprise a total of 568 deaths as compared with a total number of 775 for all causes in mental defectives. The 207 cases not considered are scattered under numerous other diseases and the numbers are so small that divisions into age groupings proved impracticable. Confining our investigation to these numerically important diseases will enable us to present results which will be much more worth while as they are subject to less chance variation.

In Table XVII we present three lines of figures for each group of diseases. The first line titled "Expected" gives the expected number of deaths which would result if we applied the death rates of the Massachusetts population to the various age groups of the mental defectives considered in this study. The second line titled "Observed" gives the actual number of deaths which occurred from this particular disease in our group of mental defectives. The third line titled "Ratio" gives the ratio between the ob-

served and expected number of deaths. For example, in the age group 2-9 years for bronchopneumonia we found that the expected number of deaths based on the population rates would be 1.1. The accrued observed number of deaths for these ages in our group was found to be a total of 29. When we calculated the ratio we obtained the figure of 26.4. This enables us to say that we had 26.4 times as many deaths among mental defectives from bronchopneumonia in the age group 2-9 years as would have been the case in the general population.

For the convenience of the reader a condensed table demonstrating these ratios is here inserted (Table XVIII). This table has been arranged in order of importance of the various diseases. That is, the disease presenting the highest ratio between the observed and expected number of deaths comes first on the list and the disease presenting the lowest ratio is placed last. In considering the material it must be again recalled that many of the diseases of lesser importance are missing and the only diseases discussed are those presenting sufficient numbers to warrant a consideration of the results.

In Table XVIII and Graph H we note that diarrhea and enteritis present the highest ratio for all age groups, a figure of 29. That is, for all age groups we may say that diarrhea and enteritis have been the cause of death in 29 times as many cases as would be expected from this cause in the general population. Epilepsy is in second position with a ratio for all age groups of 22. Bronchopneumonia presents a total ratio for all age groups of 13; influenza a ratio of 8 and infectious diseases a ratio of 8; tuberculosis—all types, lobar pneumonia and tuberculosis of lungs present a ratio of 3 each; nephritis and diseases of the heart present a ratio of 2 each.

This table presents results which are hardly in keeping with the commonly accepted opinions on the most important causes of death in mental deficiency. We note that the first heading on the list, *Diarrhea and Enteritis*, has not been considered previously as an important cause of death. *Epilepsy* and *Bronchopneumonia*, the

TABLE XVII

DEATHS FROM CERTAIN CAUSES OBSERVED AMONG THE FEEBLEMINDED (IDIOTS, IMBECILES AND MORONS) AND NUMBER EXPECTED ACCORDING TO SPECIFIC RATES FOR MASSACHUSETTS

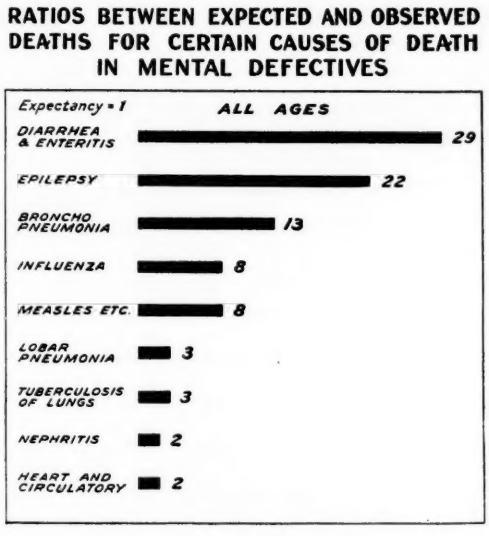
Diseases	Deaths	Age Groups						
		2-9	10-19	20-29	30-39	40-49	50-59	Total 2-59 Years
Diarrhea and Enteritis	Expected	0.5	0.2	0.1	0.1	0.1	0.1	1.1
	Observed	13.0	9.0	2.0	3.0	4.0	1.0	32.0
	Ratio	26.0	45.0	20.0	30.0	40.0	10.0	29.0
Epilepsy	Expected	0.1	0.6	0.5	0.2	0.1	—	1.5
	Observed	14.0	8.0	4.0	4.0	3.0	—	33.0
	Ratio	140.0	13.3	8.0	20.0	30.0	—	22.0
Bronchopneumonia	Expected	1.1	1.1	1.2	0.8	0.5	0.3	5.0
	Observed	29.0	19.0	7.0	5.0	6.0	1.0	67.0
	Ratio	26.4	17.2	5.8	6.2	12.0	3.3	13.4
Influenza	Expected	0.7	3.2	7.0	3.1	0.7	0.3	15.0
	Observed	16.0	35.0	45.0	23.0	7.0	1.0	127.0
	Ratio	22.8	10.9	6.4	7.4	10.0	3.3	8.4
Infectious Diseases (Measles, Whooping Cough, Scarlet Fever, Diphtheria)	Expected	2.9	1.5	0.4	0.08	—	—	4.9
	Observed	26.0	13.0	—	1.0	—	—	40.0
	Ratio	8.9	8.6	—	12.5	—	—	8.1
Tuberculosis—Total, All Types	Expected	0.9	9.0	17.2	6.7	2.6	0.9	37.3
	Observed	10.0	42.0	60.0	19.0	10.0	1.0	142.0
	Ratio	11.1	4.6	3.4	2.8	3.8	1.1	3.8
Pneumonia—Lobar and Undefined	Expected	0.7	3.1	6.8	3.5	1.4	0.8	16.3
	Observed	10.0	21.0	12.0	4.0	3.0	5.0	55.0
	Ratio	14.2	6.7	1.7	1.1	2.1	6.2	3.3
Tuberculosis of Lungs	Expected	0.2	8.2	16.1	6.2	2.4	0.8	33.9
	Observed	5.0	31.0	53.0	14.0	7.0	—	110.0
	Ratio	25.0	3.7	3.2	2.2	2.9	—	3.2
Nephritis (Acute and Chronic)	Expected	0.2	1.4	1.7	1.5	1.5	1.2	7.5
	Observed	2.0	7.0	6.0	4.0	—	—	19.0
	Ratio	10.0	5.0	3.5	2.6	—	—	2.5
Diseases of Heart and Circulatory System	Expected	0.6	5.7	4.0	3.0	3.0	3.1	19.4
	Observed	2.0	17.0	11.0	11.0	3.0	2.0	46.0
	Ratio	3.3	3.0	2.7	3.6	1.0	.6	2.3

TABLE XVIII

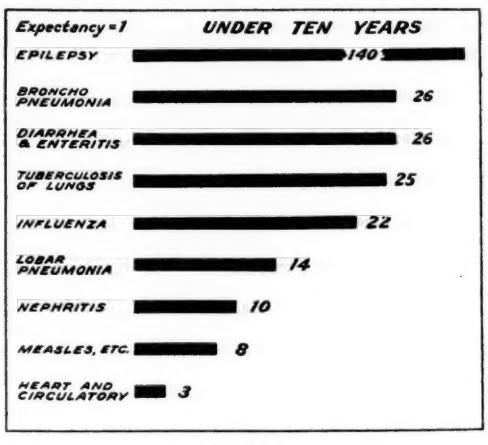
RATIOS BETWEEN EXPECTED AND OBSERVED NUMBER OF DEATHS IN MENTAL DEFECTIVES FOR CERTAIN DISEASES ARRANGED IN ORDER OF IMPORTANCE

	Ratios Age Groups						
	2-9	10-19	20-29	30-39	40-49	50-59	Total 2-59 Years
Diarrhea and Enteritis	26	45	20	30	40	10	29
Epilepsy	140	13	8	20	30	—	22
Bronchopneumonia	26	17	5	6	12	3	13
Influenza	22	10	6	7	10	3	8
Infectious Diseases (Measles, Whooping Cough, Scarlet Fever, (Diphtheria)	8	8	—	12	—	—	8
Tuberculosis—Total, All Types	11	4	3	2	3	1	3
Lobar Pneumonia	14	6	1	1	2	6	3
Tuberculosis of Lungs	25	3	3	2	2	—	3
Nephritis (Acute and Chronic)	10	5	3	2	—	—	2
Diseases of Heart and Circulatory System	3	3	2	3	1	.6	2

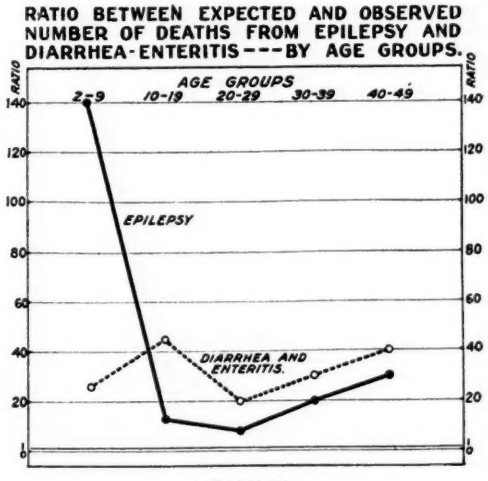
second and third diseases in order of significance, have received considerable mention, but there has been little said of the fourth disease on the list, *Influenza*. It is of particular interest to note that *Tuberculosis of the Lungs*, occupying eighth position, and *Diseases of the Heart*, occupying the last position, have always been considered as being of special significance in their association with mental deficiency. The connection between diseases of the gastro-intestinal tract, that is, diarrhea and enteritis, and mental deficiency, and also the relationship between epilepsy and mental deficiency are not at all clear, and these newly developed relationships offer new material for conjecture and further investigation.



GRAPH H.



GRAPH J.

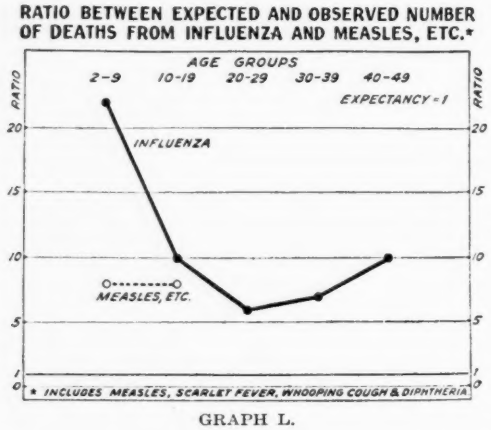


GRAPH K.

In turning to a study of the matter of age we see that the ratios in the age group under 10 years (Graph J) are decidedly higher than the ratios for all age groups (Graph H). That is, the tendency is for most of these diseases to show very high ratios in the age group 2-9 years, a little lower ratio in the age group 10-19, and then to reach a rather stable level for the remaining decades. The high rate in the age group 2-9 years is demonstrated best in epilepsy (Graph K). Here we found 140 times as many deaths from epilepsy for this age as we should expect. In the age group 10-19 years the ratio

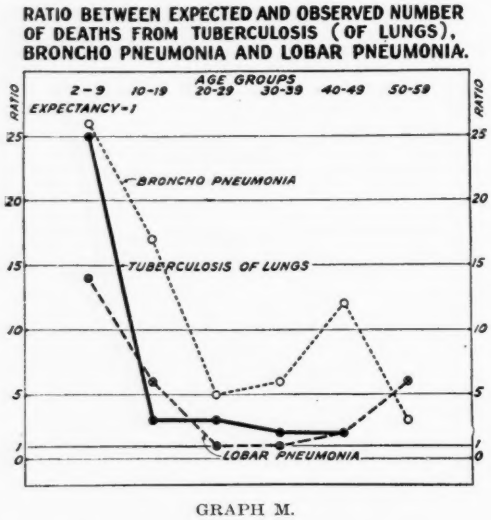
drops to 13, and to 8 in the age group 20-29. The graph outlines the uniformly high ratios for all age groups shown in diarrhea and enteritis. These ratios vary between 20 and 45 and, with epilepsy, present the highest ratios of any of the diseases.

The fact of a higher rate in the age group 2-9 years is also demonstrated in influenza (Graph L) with a ratio of 22, dropping to a ratio of 10



GRAPH L.

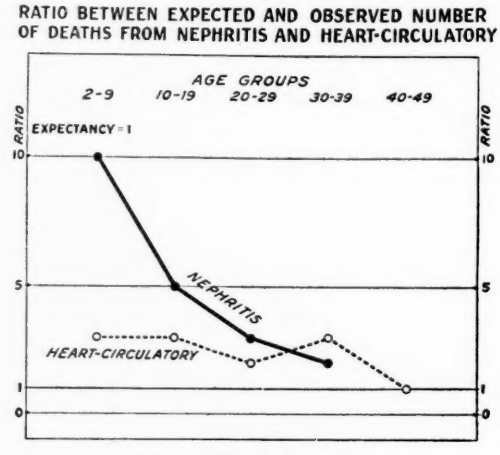
in the age group 10-19, and a ratio of 6 in the age group 20-29. On the other hand, measles presents a ratio of 8 in the age groups 2-9 years and 10-19 years, and at that point practically disappears as a cause of death. Tuberculosis of the lungs (Graph M) also shows a very high



GRAPH M.

ratio in the age group 2-9 years, a figure of 25. This drops to a ratio of 3 in the age group 10-19 years, which is preserved quite uniformly for the remaining decades. Lobar pneumonia also shows a high ratio of 14 for the age group 2-9 years, dropping to a ratio of 6 in the age group 10-19, and being very little above the expectation for the remaining decades. Bronchopneumonia presents ratios which are higher than either of the preceding diseases, 26 in the age group 2-9 years, 17 in the age group 10-19 years, dropping to a ratio of 5 in the age group 20-29 years. Nephritis (Graph N) also shows a fairly high ratio of 10 for the age group 2-9 years, dropping to 5 in the age group 10-19 years, and to still lower ratios for the remaining decades. Heart diseases show a fairly uniform ratio throughout the entire life span.

Certain diseases, however, show rather high ratios throughout the entire life span. For convenience' sake we may group the diseases into two classifications: (1) Diseases presenting uniform ratios above the expectation throughout the life span, and (2) diseases presenting high ratios in the younger age groups which decrease gradually to low figures for the higher age groups.



GRAPH N.

Diseases coming under classification (1) are Diarrhea and Enteritis, Infectious Diseases, and Diseases of the Heart and Circulatory System. Diseases belonging to classification (2) are Epilepsy, Bronchopneumonia, Influenza, Tuberculosis of the Lungs, Lobar Pneumonia and Nephritis.

In summarizing the results of this section, we may say that the data have produced a new order of importance of diseases in the subject of mental deficiency. Tuberculosis, pneumonia and heart disease have been displaced as the most significant causes of death in mental deficiency. When a population comparison is made we observe that the following diseases are worthy of the most serious consideration as causes of death in this field: (1) Diarrhea and enteritis, which produced 29 times as many deaths as might be expected in our group; (2) epilepsy, which produced 22 times the expected number of deaths; (3) bronchopneumonia which produced 13 times as many deaths as expected; (4) influenza which revealed a ratio of 8 times as many deaths as expected; and (5) infectious diseases (measles, whooping cough, scarlet fever, diphtheria), which showed 8 times as many deaths as should be expected.

EXPECTATION OF LIFE IN MENTAL DEFICIENCY

It is with some trepidation that we present the following material on expectation of life for the mental status groups idiot, imbecile and moron. In so far as we have little data concerning the higher age groups, it has been very difficult to carry out this part of the work. Thus, the results are being presented in a tentative manner rather than as representing anything definite or final. For this reason they should be interpreted very conservatively.

In arriving at these estimates of the expectation of life in our mental status groups we found it necessary to make some assumption in regard to the age groups which were not covered by our experience. These represent the ages beyond 50 for male morons, beyond 60 for the remaining males, and beyond 60 for all of the females. It seemed reasonable to assume that these people were subject to the rates prevailing among the corresponding group of the general population and to allow them the same expectation of life at 60 as would be found in the general population. This is probably somewhat too liberal, but we had no indication as to how much it should be reduced. Whether the expectation of life at the age of 60 is taken as 10 or 15 years makes relatively little difference in the expectation at 20, 30 or even 40 years. In the case of the male idiots an exception was made since their rate for the years 50-59 was higher than the State rate for both the group 60-69 years and the first of the 70-79 year group. We continued to apply this rate to those surviving at 60 until the population was entirely eliminated. The resulting expectation was 6.8 years at 60 instead of 13.4.

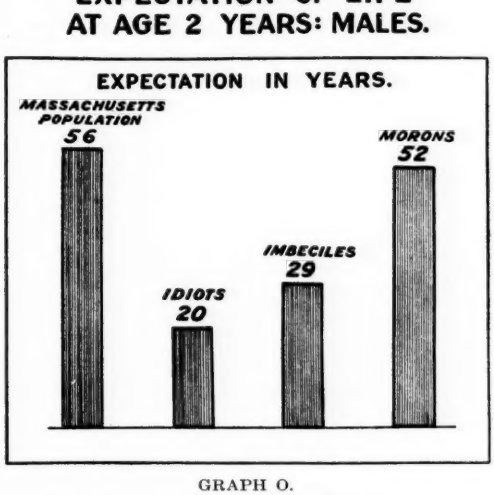
We have given no figures for expectation of life at birth, but have confined ourselves to the expectation at two years. Expectation of life at birth would be so much influenced by the rates in the first two years, for which we have no adequate estimate, that it was thought inadvisable to attempt this.

Table XIX presents the average expectation of life at certain ages for the mental status groups idiot, imbecile and moron. The expectation for all mental defectives considered as a group is also presented. These are made comparable with the population figures by the inclusion of a column on the expectation of life in the Massachusetts population. We observe that the average expectation of life for a male infant of two years in the general population is 56.8 years (Graph O). In our group this figure is reduced to 20.1 years for idiots, 29.6 years for imbeciles, 52.2 years for morons, and 30.1 years for mental defectives considered as a whole. Thus, male idiots at the age of two years may expect a reduction of 36 years in their life span; male imbeciles may expect a reduction of 27 years; and male morons a reduction of nearly 5 years. At the age of 10, males in the general population have an expectation of life of 51 years. In idiots of the same age this is reduced to an expectation of 23 years, imbeciles to an expectation of 34 years, and morons to an expectation of 49 years. Reversing this material, as before, we note that male idiots at the age of 10 face a life span which is 28 years shorter than that of 10-year-old males in the general population. The life span of the imbeciles is 16 years shorter, and that of the morons approximately 2 years shorter. It is interesting to observe that the male morons present comparatively little shortening of the life span. We observed that at age two years they have an expectation of 52 years compared with 56 years for the male population.

TABLE XIX

AVERAGE EXPECTATION OF LIFE AT CERTAIN AGES FOR IDIOTS, IMBECILES AND MORONS, COMPARED WITH THE GENERAL POPULATION

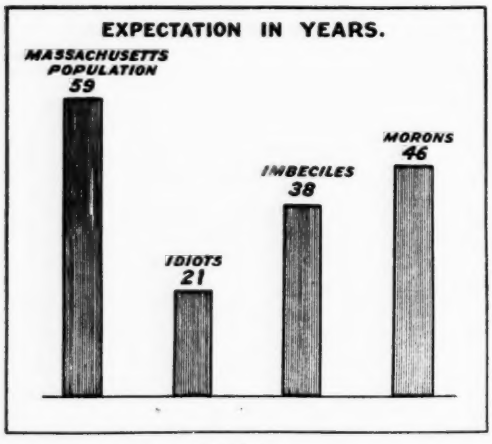
Present Age	Mass. Pop. (1910)	Idiots	Imbeciles	Morons	Total Mentally Defective
	Expectation of Life in Years				
	Males				
2 years	56.8	20.1	29.6	52.2	30.1
10 "	51.1	23.2	34.5	49.3	34.1
20 "	42.5	18.9	29.0	36.2	27.7
30 "	34.6	18.4	23.5	29.4	23.7
40 "	27.0	13.4	22.0	22.0	18.8
50 "	19.8	9.4	18.6	18.8	17.8
60 "	13.4	6.8	13.4		13.4
	Females				
2 years	59.3	21.3	38.4	46.8	32.9
10 "	53.6	30.8	44.3	43.7	41.9
20 "	44.8	29.5	40.0	35.8	37.4
30 "	36.8	24.4	34.1	27.9	30.8
40 "	29.0	18.8	27.6	21.5	24.8
50 "	21.6	18.5	19.9	14.1	18.6
60 "	14.8	14.8	14.8	14.8	14.8



GRAPH O.

Among the females we observe that the expectation of life for infants aged 2 is 59 years (Graph P). In the case of idiots this expectation is reduced to 21 years; in the case of imbeciles to an expectation of 38 years; and in morons to 46 years. Considering the group as a whole, we find that the expectation of life is reduced to 32 years. Thus, female idiots aged 2 face an expectation of life which is 38 years shorter than the average; for imbeciles this expectation is 21 years shorter than the average; and for morons it is 12 years shorter than the average.

For females aged 10 the population expectation is 53 years. For idiots this expectation is reduced to 30 years; in the case of imbeciles to 44 years; and in the case of morons to 43 years. Again reversing the attack, we note that female



GRAPH P.

idiots aged 10 have an expectation of life which is 22 years shorter than that of females aged 10 in the general population. The life span for imbeciles is shortened a matter of 9 years, and for the morons 9 years also.

These figures present in a rather startling way the fact that the expectation of life in the presence of idiocy, imbecility or moronity is markedly interfered with. This interference is least marked among the morons, the expectation of life in the latter group showing only a moderate departure from that of the general population.

Table XX presents material on the chance of surviving to the age of 60 from certain ages for idiots, imbeciles and morons. This table has the advantage of being based upon the actual observed rates between the ages of 2 years and 60 years. These rates are then compared with a similar calculation for the Massachusetts population, and demonstrate the differences between the mental status groups in a rather striking manner.

It will be observed that the male idiot aged 2 years has but one chance in 12* of surviving to the age of 60 as compared with a male infant aged 2 years in the general population. The male imbecile of the same age has one chance in 3 of surviving to the age of 60, while the male moron has a survival chance which is only slightly under that of the population.

TABLE XX

CHANCE OF SURVIVING TO AGE 60 FROM CERTAIN AGES FOR IDIOTS, IMBECILES AND MORONS COMPARED WITH MASSACHUSETTS POPULATION

Present Age	Chance of Survival to Age 60				
	Mass. Pop. (1910)	Idiots	Imbeciles	Morons	Total Mentally Defective
		Males			
2 years	.575	.048	.174	.495	.166
10 "	.601	.082	.362	.538	.242
20 "	.618	.107	.300	.560	.272
30 "	.653	.183	.356	.621	.343
40 "	.706	.241	.518	.689	.457
50 "	.798	.425	.744		.698
		Females			
2 years	.628	.098	.325	.281	.250
10 "	.653	.197	.456	.312	.396
20 "	.670	.270	.524	.329	.455
30 "	.703	.324	.584	.352	.502
40 "	.753	.406	.655	.410	.581
50 "	.833	.685	.722	.477	.691

Among the females we note that the chance for survival among the idiots and imbeciles is decidedly greater than that of the males. The female morons, however, have less survival chance than the male morons. Female idiots have one chance in 6 of surviving to the age of 60 as compared with a female infant in the general population. Female imbeciles have one chance in 2, and female morons likewise one chance in 2 of surviving to the age of 60.

Table XXI presents another interesting angle of this material, and demonstrates the chance of surviving a given number of years for certain ages in the groups idiot, imbecile and moron. The same figure for the Massachusetts population is presented also. This table demonstrates a very simple method of estimating the expected number of survivors for certain ages. If we have in our State schools 100 male idiots, 100 male imbeciles and 100 male morons, aged 10, and there are no additions to or subtractions from the original numbers, we can expect that at the end of 10 years 76 idiots, 87 imbeciles and 96 morons will be surviving. In each 100 female idiots, imbeciles and morons aged 10 we could expect to have 71 idiots, 87 imbeciles and

*It should be carefully noted that this chance of survival is obtained by comparing the chance of survival in the general population for the same age group. For example, at the age of 2, male idiots have but one chance in 21 of surviving to the age of 60. However, this chance is only one-twelfth of the chance the ordinary male enjoys. This same method is preserved in all following comparisons between the various mental status groups and the general population.

94 morons surviving at the end of 10 years. The marked difference between these groups and the general population is shown by the fact that in 100 of the general population aged 10 years we could expect to have 97 survivors in both sexes at the end of a ten-year period.

Again a word of caution is extended in reference to the interpretation of these findings. Until a study has been completed on a much larger number of cases it is advisable to consider this material as new and interesting data rather than as presenting any final conclusions.

SUMMARY

I. This analysis was based on a study of 8,976 cases of mental deficiency and 878 deaths. These cases were admitted to, were in residence within, or were discharged or died while in residence or on the books of one of the three Massachusetts State schools between the dates of January 1, 1917 and December 31, 1930, inclusive. Specific death rates by age for each of the three mental status groups idiot, imbecile and moron are presented, these death rates being determined by the person-year method of constructing life tables. This study covers the entire period during which the child was under the observation of the school. It follows through from the date of admission to the date of final discharge and includes all time the patient may have been out of the institution on visit, parole, etc.

II. Mortality among idiots is approximately five times that of the general population for both sexes (Table I). Ratios of the death rates in male idiots to males in the Massachusetts population are as follows: 2-9 years—11; 10-19 years—8; 20-29 years—9; 30-39 years—3; higher age groups—approximately 3. Ratios among females are 2-9 years—16; 10-19 years—12; 20-29 years—3; higher age groups—approximately 3.

III. Mortality among imbecile males is 2.4 times that of the general population and approximately 2 times that of the general population for females (Table II). Ratios of male death rates to males in the Massachusetts population within the age groups are 2-9 years—8; 10-19 years—4; 20-29 years—3; higher age groups—approximately 3. Ratios for female imbeciles are 2-9 years—8; 10-19 years—5; 20-29 years—2; approximately the same ratio for higher age groups.

IV. Mortality among male morons, all ages, is slightly under that of males in the general population (Table III). Among females it is slightly over, the ratio being 1.1. In contrast with the idiot and imbecile groups, morons do not show high ratios in the younger ages. The ratios of death rates in male morons compared with the Massachusetts population are 2-9 years—1.8; 10-19 years—1.2; 20-29 years—1.8; approximately same for higher ages. Ratios for females are 2-9 years—2.5; 10-19 years—1.9; 20-29 years—1.3; slightly higher for older age groups.

V. Important sex differences are noted. Male idiots show extremely high ratios up to the age of 30. Female idiots show still higher ratios than the males, but these drop off perceptibly after the age of 20. In imbeciles the sex differences are not marked, both groups presenting ratios which are high for the first two decades, reaching stability at the age of twenty. Among the morons, the females present a higher total ratio and this is observed particularly in the first two decades. Male morons present a lower total ratio. Very few differences are noted between the various age groupings.

VI. Mortality in all mental groups considered together over the general population gives a ratio of 2.3 for males in all age groups (2-59 years) (Table IV). For females we observe a

TABLE XXI

CHANCE OF SURVIVING A GIVEN NUMBER OF YEARS AT EACH OF CERTAIN AGES FOR IDIOTS, IMBECILES AND MORONS COMPARED WITH MASSACHUSETTS POPULATION

	Mass. Pop.	Idiots	Imbeciles	Morons	Total Mental Defective
Males					
At 2, chance of surviving 8 years	.956	.769	.663	.920	.685
At 10, " " " 10 "	.973	.767	.873	.961	.891
At 20, " " " 10 "	.947	.584	.843	.901	.793
At 30, " " " 10 "	.924	.756	.689	.903	.753
At 40, " " " 10 "	.885	.584	.697	.688	.653
At 50, " " " 10 "	.798	.426	.742		.696
Females					
At 2, chance of surviving 8 years	.962	.503	.713	.899	.962
At 10, " " " 10 "	.974	.719	.873	.949	.869
At 20, " " " 10 "	.954	.835	.895	.936	.906
At 30, " " " 10 "	.933	.798	.892	.861	.864
At 40, " " " 10 "	.905	.592	.906	.857	.841
At 50, " " " 10 "	.832	.686	.756	.477	.692

ratio of 2.1. Ratios for all male mental defectives are 2-9 years—8; 10-19 years—4; 20-29 years—4; higher age groups—3 or lower. Ratios for all female mental defectives are: 2-9 years—11; 10-19 years—5; 20-29 years—2; higher age groups—2 or lower.

The tendency is for female mental defectives to die under the age of 20, but those who survive have a fairly good chance of living to older ages. Male mental defectives do not die as rapidly under the age of 10, but have a higher death rate than the females throughout the remaining years of the life span.

VII. In a comparison made between the U. S. Census study of 1,347 deaths in institutions for mental defect throughout the United States during the year 1922 and the present Massachusetts study of 878 deaths over a fourteen-year period, the recorded death rates for the country as a whole were found to be definitely higher than those of the Massachusetts study (Table V). This difference was evident in each mental status group. In all groups combined the United States Census study recorded a death rate per 1,000 under treatment of 32.2 for males and 24.8 for females. The Massachusetts rate was 20.5 for males and 16.2 for females.

VIII. An attempt was made to determine the number of survivors that we might expect at the various ages. This was accomplished by starting with an initial population of 1,000 persons born, applying the observed death rates for each group by decades and thus determining the number of persons who would die in each age group. When the number of deaths for the age group 0-9 years was subtracted from the initial group of 1,000 we obtained the expected number of survivors at the age of 10 years. This material was worked out for all mental status groups and for both sexes. In so far as there were no cases within our State schools under 2 years of age and, therefore, no deaths, we had no way of obtaining rates for the period 0-1.99 years. However, an estimate was made for this period based on the observed rate between 2 and 9 years. The material then is presented in two ways: It shows the expected number of survivors from birth based upon an estimated rate for the age group 0-9, and the expected number of survivors from 2 years based upon the actual observed rates for the ages 2-9 years.

Table VI shows the results obtained throughout the various age periods by using both methods. For the sake of brevity the first method only was presented. Applying the observed death rates we find that for 1,000 male idiots born the survivors at certain ages will be as follows: At 10 years—276 persons; 20 years—211 persons; 30 years—124 persons; at 40 years—93 persons; at 50 years—55 persons; and at 60 years—23 persons. Survivors among 1,000 female idiots (Table VIII) will be: At 10 years—268 persons; 20 years—193 persons; 30 years—161 persons; at 40 years—128 persons; at 50 years—76 persons; and at 60 years—52 persons.

IX. The survivors among 1,000 male imbeciles born will be as follows (Table VII): At 10 years—314; at 20 years—274; at 30 years—231; at 40 years—159; at 50 years—111; and at 60 years—82. Survivors among 1,000 female imbeciles (Table VIII) born will be: At 10 years—387; at 20 years—338; at 30 years—302; at 40 years—270; at 50 years—244; and at 60 years—185.

X. Among 1,000 male morons born we may expect that the survivors will be as follows (Table VII): At 10 years—705; at 20 years—678; at 30 years—610; at 40 years—551; and at 50 years—379. The survivors for 1,000 female morons born (Table VIII) will be: At 10 years—722; at 20 years—685; at 30 years—641; at 40 years—552; at 50 years—473; and at 60 years—225.

XI. In determining the number of survivors by applying the observed death rates for idiots, imbeciles and morons combined, we find that from 1,000 male mental defectives and 1,000 males in the general population we may expect the following number of survivors (Table VII): At 10 years—325 as compared with 803 in the population; at 20 years—290 as compared with 780 in the population; at 30 years—230 as compared with 739 in the population; at 40 years—173 as compared with 683 in the population; at 50 years—113 as compared with 604 in the population; at 60 years—79 as compared with 482 in the population.

XII. Applying the observed rates for female mental defectives we obtain the following number of survivors (Table VIII): At 10 years—341 as compared with 831 in the population; at 20 years—296 as compared with 809 in the population; at 30 years—268 as compared with 772 in the population; at 40 years—232 as compared with 720 in the population; at 50 years—195 as compared with 651 in the population; at 60 years—135 as compared with 542 in the population.

XIII. The well-known fact of higher death rates among males than females is accentuated among mental defectives. In this group the chance for the survival of females is decidedly above that of males and higher than is to be expected after the population sex difference has been considered (Table IX).

XIV. The most important causes of death among mental defectives are as follows (Tables X and XI): Influenza—16 per cent.; tuberculosis of lungs—14 per cent.; bronchopneumonia—8 per cent.; lobar pneumonia—7 per cent.; diseases of heart—6 per cent.; epilepsy—4 per cent.; diarrhea—4 per cent.; and measles

—3.9 per cent. Sex differences are observed. Influenza, lobar pneumonia and diarrhea are more important as causes of death among the males. Among the females we note higher proportions of tuberculosis of lungs, bronchopneumonia, epilepsy and measles.

In summarizing the results for mental defectives as a whole, we may say that infectious diseases cause the largest number of deaths. They are also susceptible to diseases affecting the respiratory system.

XV. When the total deaths are classified in accordance with the main groupings of the International List of Causes of Death (Table XII), we gain a little clearer conception of the numerical importance of the various systems. Epidemic, endemic and infectious diseases comprise 42 per cent. of the total deaths; diseases of the respiratory system contribute 19 per cent. of deaths; diseases of the nervous system make up 10 per cent.; diseases of the digestive system—8 per cent.; and diseases of the circulatory system—5 per cent.

XVI. When we consider the causes of death for the separate groups idiot, imbecile and moron, four situations are observed. These are as follows (Table XIII):

(a). In certain diseases the percentages present an upward trend as the higher mental levels are approached and show the highest percentage among the morons. Diseases in this group are influenza, nephritis and cerebral hemorrhage.

(b). In certain diseases the percentages present a downward trend as the higher mental levels are approached, the highest percentage being shown among the idiots. Diseases in this group are bronchopneumonia, epilepsy, and diarrhea and enteritis.

(c). Some diseases present the highest percentage among the imbeciles. Diseases in this group are lobar pneumonia, diseases of the heart and circulatory system, and malformations.

(d). Still other diseases show percentages which do not vary greatly for the three mental groups. Diseases in this classification are tuberculosis of the lungs and tuberculosis—other forms.

XVII. From this material it becomes evident that the diseases supposedly demonstrating a selective action in the case of idiots—namely, diarrhea, epilepsy and bronchopneumonia—are the common causes of death in all young age groups and could be expected to make an appearance at the ages during which the idiots have high death rates. On the other hand, diseases with highest proportions among the morons—namely, influenza, nephritis and cerebral hemorrhage—are simply the diseases which are common causes of death in the higher age groups or the ages in which the morons die in larger numbers.

XVIII. No important sex differences are observed in the causes of death in the mental status groups. Influenza and lobar pneumonia have larger proportions among the males in all three groups idiots, imbeciles and morons. All other diseases are scattered in their sex distribution.

XIX. An interesting comparison was made between the causes of death in our study and the results as found in three other studies (Table XIV). These comprised the following: (1) The U. S. Census Report on Feebleminded, 1923; (2) the report by Barr on deaths at Elwyn, Pennsylvania; and (3) the report by Tredgold on deaths at the Earlswood Asylum, England. There was considerable agreement in the three American reports on tuberculosis. Tredgold's report, however, showed a much larger percentage of deaths from this cause. Pneumonia as a cause of death showed a lower percentage in the English institution than in the American reports.

Because of the many gaps in classification between the four reports, certain of the diseases were grouped into main sections of the International List. Thus, the Earlswood Asylum presents the largest percentage. 47.9, of patients dying from epidemic, endemic or infectious diseases. Massachusetts is second, with 41.5 per cent. In diseases of the nervous system, the Elwyn study presented the largest percentage of deaths under this classification, 35.3. The U. S. Census report and the Earlswood report showed about the same percentage, 23.3 and 23.6 respectively. Massachusetts showed only 10.3 per cent. of deaths due to diseases of the nervous system. Diseases of the digestive system had the largest percentage at Elwyn, 17.4 per cent., and the smallest percentage at Earlswood, 4.3 per cent.

Two important features stand out in this comparison: (1) The unusually high percentage of deaths from tuberculosis within the English group as compared with the three American groups, and (2) the low proportion of deaths due to epilepsy in the Massachusetts study.

XX. In continuing our study on causes of death we made a comparison between the causes of death in mental defectives and the same causes in the Massachusetts population. All deaths in Massachusetts were studied for the same period as that covered by this analysis. Death rates were then determined for specific causes and for the different age groups. By applying these rates to our material we then calculated the number of deaths from each cause and age which we could expect in our group of mental defectives. We have available the number of deaths which actually occurred, the *observed* number, for comparison with the *expected* number. The ratio of the observed to the expected deaths for a disease and age group pre-

sents a ready index of the relative importance of the specific disease as applied to mental defect.

XXI. Comparisons between the expected and observed deaths for certain main groupings in the International List of Causes of Death reveal the following ratios for the total of all age groups (Table XV): Diseases of the nervous system present seven times as many deaths as would be expected from a population group; diseases of the respiratory system are second with a ratio of 6; epidemic, endemic and infectious diseases present a ratio of 5; diseases of the digestive system—5; non-venereal diseases of the genito-urinary system—3; and diseases of the circulatory system—2. Diseases of the nervous system in first position and diseases of the circulatory system in last position as causes of death in mental defectives present decidedly new material.

XXII. The ratios of observed over expected deaths for the various main groupings show marked variations within the specific age groups. Thus, diseases of the nervous system present 28 times the expected number of deaths for the age group 2-9 years (Table XVI); in the age group 10-19 years the ratio drops to 6, and this ratio is preserved approximately for the remaining age groups. Diseases of the respiratory system present a ratio of 24 in the age group 2-9 years, for the age group 10-19 years a ratio of 9, and for 20-29 years a ratio of 2. All of the disease groups present very high ratios for the first two decades, and high but comparable ratios for the older ages. The only exception is noted in diseases of the circulatory system which present a ratio of approximately 3 for all age groups.

XXIII. When we now compare the observed and expected deaths in specific diseases, we have even more pronounced results. Ratios of observed over expected deaths for certain diseases within the ages 2-59 years are as follows (Table XVII): Diarrhea and enteritis present 29 times as many deaths as expected; epilepsy presents a ratio of 22; bronchopneumonia a ratio of 13; influenza, 8; infectious diseases, 8; lobar pneumonia, 3; tuberculosis of lungs, 3; nephritis, 2; and heart and circulatory system, 2. By this new method of comparing observed deaths with expected deaths based on population rates, diarrhea and epilepsy are placed in first positions with ratios of 29 and 22. Tuberculosis and diseases of the heart, which were previously considered as chief causes, are displaced downward in order of importance, and present ratios of 3 and 2.

XXIV. Diseases present different ratios for the various age groups (Table XVIII). For instance, in the diseases diarrhea and diseases of the heart the ratios are quite comparable for all of the age groups. In epilepsy, bronchopneumonia, lobar pneumonia and tuberculosis of lungs they are very high in the first decade, lower in the second decade, and still lower but comparable for the remaining age groups. The same tendency to high ratios in the younger ages with smaller differences between the remaining age groups is seen in influenza and nephritis. The highest ratio is found in epilepsy which presents the following ratios for the different age groups: 2-9 years, a ratio of 140; 10-19 years, 13; 20-29 years, 8; 30-39 years, 20; and 40-49 years, 30. The lowest ratios are observed in diseases of the heart. They are 2-9 years, a ratio of 3; 10-19 years, 3; 20-29 years, 2; 30-39 years, 3; 40-49 years, 1; and 50-59 years, .6.

XXV. Very high ratios observed in diarrhea and epilepsy suggest that study of the pathological processes involved may give us some hint as to the unusual susceptibility of the mental defective to these diseases.

XXVI. The data of this study have produced a new order of importance of diseases as causes of death in mental defectives. Tuberculosis, pneumonia and heart disease have been displaced as the most significant causes. Diarrhea and enteritis, epilepsy, bronchopneumonia and influenza have been shown in the present study to be the primary causes of death in mental defectives within our institutions.

XXVII. Data on the average expectation of life at certain ages for idiots, imbeciles and morons as compared with the Massachusetts population show the following results (Table XIX). The average expectation of life for a male infant of two years in the general population is 56.8 years. For idiots this figure is reduced to an average expectation of 20.1 years; for imbeciles, 29.6 years; for morons, 52.2 years; and for mentally defective males as a whole, 30.1 years. For a female infant of two years the average expectation of life is 59.3 years; for idiots, 21.3 years; imbeciles, 38.4 years; morons 46.8 years; and all mentally defective females, 32.9 years. The average expectation of life for other ages is also presented.

The expectation of life in the presence of idiocy or imbecility is markedly interfered with in each age period. This interference is less marked among the morons, the expectation of life in this group showing only a moderate departure from that of the general population.

XXVIII. In considering the chances for survival of idiots, imbeciles and morons in the various ages we find (Table XX) that a male idiot aged two has but one chance in 12 of surviving to the age of 60 as compared with a male infant aged two years in the general population. Female idiots aged two have one chance in 6 of surviving to the age of 60. The survival chance for the other mental status groups is presented also.

XXIX. An estimate was made of the chance

of surviving a given number of years for certain ages in the groups idiot, imbecile and moron (Table XXI) and a comparison made with the Massachusetts population. With a given number of 100 male idiots, 100 male imbeciles and 100 male morons aged 10, and with no additions to or subtractions from this original number, we can expect that at the end of 10 years 76 idiots, 87 imbeciles and 96 morons will survive. In each 100 female idiots, imbeciles and morons aged 10 we could expect to have 71 idiots, 87 imbeciles and 94 morons surviving at the end of 10 years. The difference between these groups and the general population is shown by the fact that in 100 of the general population aged 10 years we would expect 97 survivors for each sex at the end of 10 years.

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SPONTANEOUS RUPTURE OF THE HEART

With Case Report*

BY FREDERICK R. BARNES, M.D.†

SPONTANEOUS rupture of the heart was first described by William Harvey, who observed precordial pain in a patient and at autopsy discovered "an impediment to the passage of the blood from the left ventricle into the arteries[1]". Elleaume in his thesis which appeared in 1857 summed up the contributions to the subject of rupture of the heart and since this date Quain, Barth, and others have assembled cases from the literature[2]. The clinical picture presented, however, differs little from the early account of Harvey in his second letter to Riolan in 1649, in which he describes the distressing pain of Sir Robert Darcy.

"The patient had distressing pain in the chest, syncopal attacks with suffocation, and finally cachexia and dropsy. In one of the severe paroxysms death occurred. At autopsy it was discovered that the wall of the left ventricle of the heart was ruptured, having a rent therein of size sufficient to admit any of my fingers, although the wall itself appeared sufficiently thick and strong."

The condition usually occurs in an acute infarct of the anterior surface of the left ventricle, due to a gradual fibrotic occlusion in the lumen. The myocardial degeneration may take place and remain unrecognized until microscopic analysis reveals the necrosis and infiltrative changes. The rent may occur in any chamber but is found most often in the left ventricle on the anterior wall not far from the septum. Although about two-thirds of the patients in Quain's series were over sixty years of age, an embolic infarct of the left ventricle occurred in the case of a baby four months old.

In the dramatic case reported by Reznikoff[3] the patient was 43 years old. Especially remarkable was the peculiar irregular rhythm of the heart beat,—eight beats at a definite regular rate and then an abrupt shift to eight beats of a totally different yet equally regular rate. The man complained of severe pain over the lower part of the left chest which began ten days prior to admission. Morphine had no effect on the unrelenting pain. The arteries were thickened and tortuous wherever they could be examined. The patient gradually became more orthopneic and dyspneic and was bathed in a cold perspiration.

That same evening while under observation he had an attack of projectile vomiting, his wrist pulse became imperceptible, and he became deeply cyanosed. After four deep inspirations 30 seconds apart the man collapsed and died, presenting a classical picture of spontaneous rupture of the heart. The stethoscope was promptly placed over the precordium and the examiner heard a continuous muffled, low-pitched, rushing sound, louder during expiration. No heart sounds were evident. At autopsy an irregular laceration of the wall of the left ventricle near the interventricular septum midway between the base and apex of the heart was discovered. The interpretation of the clinical course of the disease was as follows:

1. A sudden thrombosis of the calcified coronary artery resulting in degeneration of the heart muscle.

2. At the time of the collapse and the projectile vomiting, a rupture of the left ventricle causing immediate death.

In the cases compiled by Locke[4] and Krumbhaar and Crowell[5] the prodromal stages were vertigo, cough, dyspnea, syncope, anginal pain, vomiting, and hematemesis. Some cases were without symptoms. In both the auricular and the ventricular cases death comes suddenly, the patient seeming to fall over dead or is found dead. Acute collapse and air hunger accompany the final collapse, and in observable cases the rushing sound is always heard over the precordium.

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The duration of symptoms varies. Osler[6] had a case in which the patient walked up a steep hill after the onset of the attack and lived thirteen hours. In one instance the patient lived for eleven days. When death is reported to have taken place days after the initial symptoms, the first stage is probably coronary occlusion followed by actual rupture just before death.

The following tables compiled by Krumbhaar and Crowell[7] show the time of survival after the onset of symptoms and the site of rupture:

TABLE I

Survival	No. of patients	%
Sudden	288	72.0%
Less than 10 minutes	31	7.7
10 to 20 minutes	8	2.0
20 minutes to 1 hour	3	.8
1 hour to 12 hours	34	8.5
12 to 48 hours	17	4.2
2 days to 8 days	13	3.3
8 days or more	6	1.5
	400	

This table includes traumatic as well as spontaneous rupture cases. Rojas and Elizalde[8] demonstrate how in traumatic cases the patients survive longer. A patient may live several hours after spontaneous rupture of the heart if the blood escapes in the form of a dissecting hematoma, and clots because of slow, gradual extravasation and engorgement of the lungs. When the auricle is involved death is more rapid, for when extravasation occurs rapidly the blood cannot escape from the pericardium.

The following table based on a clinicopathologic study of 618 cases shows the sites of rupture:

TABLE II

Site	No. of patients	
Auricle, right	35	5.7%
Auricle, left	12	2.0
Ventricle, right	63	10.2
Ventricle, left	493	79.7
Miscellaneous, septum or apex	15	2.4

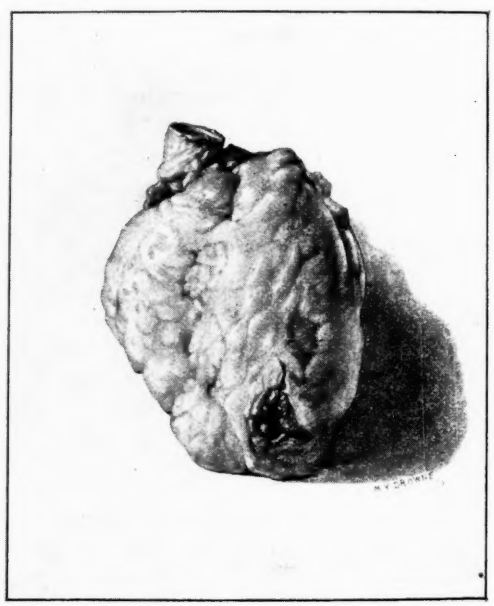
Martin and Waugh[9] found only twenty-five cases of rupture of the septum ventriculorum on record. In their case symptoms were similar to those of rupture at any other site, and were ascribed to a gradual thrombosis occurring in the left coronary artery. The sudden loud extensive murmur was of maximum intensity over the immediate precordial region and was not referable to any particular valvular lesion. Skeen and Dow[10] in the cases which they observed noted at autopsy a decided narrowing of the lumen of the right coronary artery sufficient to cause almost complete obstruction of the channel, together with secondary fibrotic and degenerative changes in the cardiac muscle in the region near the site of the rupture. Although coronary thrombosis is commonly given as the cause of the rupture, in many instances the coronary arteries were found to be normal at autopsy. The anterior surface of the left ventricle is the usual site of spontaneous rupture because the descending branch of the left coronary is most markedly atheromatous and most frequently thrombosed. The greater pressure in the left ventricular chamber is conducive to sclerosis and rupture. Moreover, the posterior surface of the chamber has firmer support than the anterior; hence it is less frequently the site of rupture.

Since the terminal symptoms of rupture of the heart come on very suddenly, antemortem diagnosis is rarely possible. There have been cases which at autopsy revealed a healed rupture of the heart, but in general death is inevitable. In the case reported below the rupture occurred on the anterior surface of the left ventricle, the most frequent site. But it is rare to have the rupture occur so near the apex. The patient was fifty years old, ten years younger than the average individual stricken with spontaneous rupture of the heart.

The number of cases tabulated above would lead to the assumption that the disease is comparatively common. Yet the incidence is 23 cases in 37,000 autopsies according to Krumbhaar and Crowell[11]. The Massachusetts General Hospital had 1 case in 4,076 autopsies, and the Boston City Hospital 5 in 5,800 autopsies. The combined figures give an incidence of .06 of 1 per cent.[12]

CASE REPORT

J. G., a well-developed male, 50 years of age, five feet nine inches tall, was seen by his physician at



7:30 P. M. January 11, 1931. He complained of severe pain in his left arm and anterior chest. The physicians diagnosed his condition as a severe cold. At 9:15 P. M. the man had a sudden attack of intense pain and collapsed, falling against the stove and lacerating his forehead. Death was almost instantaneous.

The autopsy findings were as follows:

The body is that of a well-developed and well-nourished male. There is a lacerated wound 1¼ inches in length on the right frontal region close to the hairline. A second wound at the right fronto-parietal junction is 1 inch in length.

Both lungs are perfectly free and crepitant throughout. They show less pigmentation than was ever encountered before in an adult.

All the organs are normal except the heart, which is markedly enlarged. On opening the pericardial sac, it was discovered that instead of its containing the usual straw-colored fluid, it was literally filled with blood, some flowing, some coagulated. After the blood was sponged out of the pericardial sac, a rupture was discernible in the left ventricle one inch from the apex on the anterior surface and extending into the axis of the heart for 1½ inches at its lowermost portion. The tear was stellate in form and three-quarters of an inch across, running to a point at its uppermost extremity. (See illustration.)

Histopathological Diagnosis: Spontaneous rupture of the left ventricle of the heart.

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HORSESHOE KIDNEY

Report of Unusual Form

BY JOSEPH TARTAKOFF, M.D.*

THE urinary system in man yields a high percentage of deviation from the normal state, and among the more frequent anomalies in form is the fused or horseshoe kidney. The condition is by no means uncommon; Carlier and Gérard[1] reporting 80 cases in 69,000 autopsies, Morris and Socin[2] 13 in 16,000, while at the Mayo Clinic it was encountered in 17 of a series of 2,424 kidney operations; a percentage incidence of .12, .08 and .7 respectively. Comparison of the general autopsy incidence with the specific incidence in renal surgery leads to unjustified conclusions, but Taylor[10] believes that the comparison is of some value and that the anomalous organ is predisposed to pathology.

Fusion of the kidneys probably occurs at about the sixth or seventh week of fetal life as the organs pass from the relatively narrow pelvis into the larger abdominal cavity. The upper poles having passed the pelvic brim are free to deviate laterally which allows of approximation of the lower poles, and if contact is made at the mid-line, fusion becomes a possibility. This hypothesis does not explain the rare instance of fusion of the upper poles.

Once having fused, the organs are impeded in their ascent in the abdomen and come to occupy a position lower than normal, lodgment at the pelvic brim or one iliac fossa having been reported.

The actual form assumed varies widely[4]; most commonly there are two unequal lateral masses joined across the mid-line by a bridge of fibrous or renal tissue[3]. Rarely the isthmus lies posterior to the aorta and inferior vena cava—more frequently anterior to the great vessels. The restraining commissure prohibits lateral migration of the kidneys so that the adult organs lie closer to the median line than normal. Likewise the organs are restrained from conforming to the planes of the posterior abdominal parietes and the lower poles remain approximated rather than the upper as in the normally developed organ.

The primitive renal pelvis lies anterior to its metanephric consort and only after the organ gains the freedom of the abdominal cavity does medial rotation occur. In the anomaly under consideration fusion occurs before this stage is reached so that the pelves retain their fetal anterior position; largely extra-renal and unsupported by parenchyma.

Demonstration of these several facts by roentgenography, the caudal position of the organs, their approximation to the mid-line, the proximity of the lower rather than the upper poles and the non-rotated position of the pelves constitute the basis on which preoperative diagnosis is made.

The pelves are, with rare exception, two in number and drained by separate ureters passing anterior to the isthmus. Their exposed position makes the ureters particularly liable to pressure and the kidneys prone to obstructive pathology.

The vascular supply of the organ is subject to wide variation, the primary vessels are usually more than two in number and bifurcate before reaching the hilus of the kidney. Liberal opportunity is afforded for ureteral obstruction by aberrant vessels.

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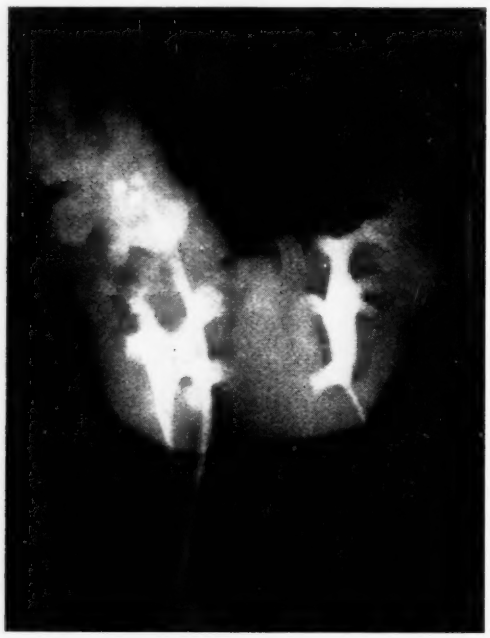
As indicated above the anomalous organ is more subject to disease than the normal. The poorly supported pelvis readily dilates in response to minor obstructive lesions, and many cases of hydro- and pyo-nephrosis have been reported[5, 6, 7]. Likewise lithiasis is a common finding and occasionally hemi-nephrectomy with division of the isthmus has been performed for its cure[8, 9, 10]. Tuberculosis is not uncommon. Oraison[11] reports a single case with a diagnosis of the complicating anomaly made at operation. Rochet and Thévenot[12] collected



11 cases of which 7 were operated with a favorable outcome in 5. These authors stressed the physiologic independence of the two halves of the organ, and the failure of the pathologic process to invade the second kidney by continuity.

As noted hitherto, diagnosis of the condition is largely roentgenographic. The x-ray evidence on which such diagnosis is made may be gained by retrograde or intravenous urography. The former method has the advantage of making possible actual measurement of the ureters, which in the caudally placed organ is less than the normal. Rovsing and Israel[13] describe the sign which bears the name of the former—pain in the erect position which disappears when the patient lies down, but this finding according to subsequent observers is by no means constant. Occasionally a palpable mid-line tumor together with definite urologic symptoms and positive urinary findings may lead to a presumptive diagnosis.

The specimen here reported was an incidental finding at postmortem of a patient dying of a temporal glioma, no suspicion of renal anomaly or disease having been entertained while the cerebral symptomatology held the center of clinical interest. The accompanying plate is a photographic reproduction of a roentgenogram taken after injection of the specimen with 12.5% sodium iodide.

As shown in the illustration the specimen consists of unequal lateral kidney masses joined at their lower poles by a broad commissure of renal parenchyma. The point of fusion and the slant of the organs are those usually found, but the broad isthmus is in contrast to the usual fibrous band. The left mass presents a single pelvis and ureter without evidence of obstruction or other pathology. The fetal position of the pelvis is well shown, and the presence of major calyces on both sides of an elongated pelvis constitutes a diagnostic picture.

On the right there are two distinct pelves, the ureters of which join about half way to their termination. The lower pelvis is normal and drains freely. At the ureteropelvic junction of the upper pelvis there is a small transverse vein effectively obstructing outflow. Dilatation of the pelvis has proceeded to a moderately advanced stage and infection with secondary stone formation has occurred.

The vascular supply of the organ consists of two primary arteries and veins on each side with a smaller central artery supplying the isthmus; numerous secondary branches are given off before the vessels reach their respective kidneys.

Search of the literature yields innumerable reports of horseshoe kidneys, many successfully diagnosed and operated, but no description was encountered comparable to the above.

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CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 18121*

A CASE WITH THE CLINICAL APPEARANCE OF NEUROSIS BUT WITH FATAL TERMINATION

MEDICAL AND SURGICAL DEPARTMENTS

PRESENTATION OF CASE

DR. EARLE M. CHAPMAN**: *First admission.* This is the story of a thirty-nine year old American sales manager who entered the Baker Memorial in May complaining of pain in the left lower quadrant of five months' duration.

In going into his history at the time we found that he had been very active in business life. He had been working overtime and under tremendous tension in an attempt to reduce overhead expenses in his company. At home also he had been under great nervous strain. His mother-in-law had been ill with cancer and he had been with her at the bedside until death. When he was tired he used alcoholic stimulants, and noticed that they caused burning in the lower abdomen for twenty minutes or so. Beginning in January he first noticed pain in the midepigastrium coming on suddenly after a meal. This disappeared rather quickly and did not trouble him again until February, when it was brought on twice by drinking cocktails. He continued a strenuous life, getting little sleep. The pain returned in March and April and became persistent. It radiated now from the left lower quadrant around to the back and localized in the midlumbar area. X-ray examination showed an area suggesting a diverticulum of the sigmoid. The duodenum showed spasm, but ultimately showed satisfactory filling of the cap. He was given a five meal diet and medicine without much relief. In April he became tired out and was wakened by this pain every night. He began to have constipation, to lose weight and to feel ill. The backaches were more severe. Two weeks before admission another X-ray examination showed increased peristalsis in the sigmoid and the lower portion of the descending colon and a bud-like projection from this part of the bowel. He spent a week in Atlantic City, but headaches and increased irritability in addition to his other symptoms made him quite uncomfortable. The day before entry he vomited and noticed a blood streak in the vomitus. He had lost several pounds in the past six months, perhaps fifteen.

In the family history it is noted that his mother had died of a cancer.

His past history was negative except that a year before admission he consulted a urologist for gravel in the right kidney. This was subsequently relieved without operation. He was a very energetic man who tended to overdo and to get insufficient sleep.

Physical examination at entry showed very little except some tenderness in the abdomen. There were no masses. The blood pressure was 160/114. It did not change with the patient lying down or sitting up and remained at about that level at two examinations.

Laboratory examination at that time showed a red cell count of 4.2 million, hemoglobin 70 per cent, white cell count 10,000. The smear showed slight achromia, slight variation in size and slight increase in platelets. Examination of one stool showed a moderately positive guaiac test. The examination was not repeated. The urine was normal. The non-protein nitrogen was 32.

X-ray examination showed no residue in the stomach at six hours. The head of the motor meal was in the cecum. The esophagus showed transient spasm of the cardiac orifice, present for only a few seconds. The stomach was of the usual size and shape, without filling defects or irregularities. The first and second portions of the duodenum filled readily and remained filled. Their outlines appeared smooth. There was reversed peristalsis of the second and proximal portions of the third portion of the duodenum. At the left margin of the second lumbar vertebra there was an apparent constriction in the third portion of the duodenum and an irregular fleck of barium was retained at the site of the constriction. The proximal duodenum was only slightly dilated. There was no six hour residue in this portion of the duodenum.

The patient stayed in the hospital only three days. The pain was relieved somewhat under luminal and bed rest. The explanation at the time was that it was largely of psychic origin, due to overwork. He was discharged with a diagnosis of diverticulitis, and was advised to rest.

History of interval. After leaving the hospital he was miserable. He worked for three days, then stayed at home and rested. He had sharp intermittent lower abdominal and midback pains which for a few days before readmission were quite severe and radiated around the left flank. He said that he thought the pain was of a nervous origin because he noticed that when he was quiet and there were no external

*This report gives the essentials of two discussions, one in Dr. Cabot's Third Year class, one at a conference of the hospital staff.

**Resident on the West Medical service.

stimuli he had no pain, but, in spite of care, if he moved the pain came on rather quickly.

Second admission. He returned June 2. Blood examination at that time showed a red cell count of 4.1 million, hemoglobin 65 per cent. Three stool specimens gave positive guaiac tests. X-ray of the spine proved to be negative. After five days' rest in bed with luminal and pantopon he felt much better. He left for a two weeks' rest in the country with the explanation, which he quite readily accepted, that the pain was due to his general condition.

Third admission. A month later he came into the hospital, having gone down hill rather rapidly in the previous two weeks. He had lost weight and had been vomiting almost daily.

At that time he looked ill. His face was pinched and drawn. Examination showed a liver palpable about 4 centimeters below the right costal margin. There was a vague sense of a mass in the midepigastrium. Otherwise the examination was not remarkable.

Laboratory examinations showed a stool with a strongly positive guaiac test, a red blood cell count of 4.0 million, hemoglobin 60 per cent, a van den Bergh of 7.4 and an icteric index of 35. The urine showed a yellow test for sugar on three of seven examinations.

Two days after admission jaundice developed, and within a week became moderately severe.

X-ray examination of the gastro-intestinal tract was repeated. There was a thirty per cent residue in the stomach after six hours. The lesion in the third portion of the duodenum appeared to produce more obstruction than at the last examination. A retained fleck of barium was seen in the center of the defect. There was reversed peristalsis and spasm of the proximal duodenum. A Graham test was positive. In the presence of jaundice it was thought impossible to differentiate disease of the bile ducts and of the gall bladder. A second examination five days later showed a six hour residue in the stomach about equal to that at the last examination. The examiner was particularly impressed at this examination with the mass in the epigastrium, which seemed to displace the stomach downward and perhaps extended into the region of the third portion of the duodenum. At twenty-four hours there was a larger residue in the stomach than at six hours.

Exploration was done without other procedure. Following operation the course was rapidly downhill. Four weeks later the patient died.

Clinical Discussion
in third year class

Dr. Maurice Fremont-Smith: The observation that alcoholic stimulants caused burning in the lower abdomen lasting twenty minutes is interesting. The only thing that we should expect alcohol to cause would be irritation of the stomach.

We ought to know more about that pain which began in January. It is unnecessary to say how very carefully any pain should be described, —what brings it on, what relieves it, exactly where the pain is first felt and where it is later felt, what the radiation is. Here we have not a good description of the pain.

He is a very young man for a diverticulum of the sigmoid. That usually comes on after fifty and usually does not give any symptoms of pain until there is infection around it, a perisigmoiditis. Certainly it would be very difficult to explain pain from a diverticulum at the lower end of the intestinal tract being brought on immediately after food or alcohol unless the patient had marked diarrhea, in which case with a very sensitive intestinal tract the wave might pass rapidly down and he might have pain low in the abdomen after taking stimulating food. It seems difficult to explain that pain in the abdomen by a diverticulum of the sigmoid.

We have to consider the always present possibility that spasm or difficulty in filling the duodenum at x-ray examination may be due to causes outside the duodenum. If the barium nauseates the patient or is given too cold the duodenum may show spasm that can be interpreted as duodenal ulcer. Another thing that causes spasm is some change in the vagus nerve. In tabes with abdominal or epigastric symptoms we may have an x-ray picture suggesting duodenal ulcer with a definite filling defect. If we atropinize the patient, a second x-ray may show a perfectly normal duodenum. It is possible also to have spasm in the duodenum from a subacute appendix. Here they merely say spasm, so they realized the fact that there probably was not an ulcer in the first portion of the duodenum.

The fact that a five meal diet and medicine gave him no relief again is a very good argument against duodenal ulcer, unless an ulcer has penetrated through to the peritoneal coat, resulting in a slight localized peritonitis. In that case food will not relieve it. Those are the ulcers that have to be watched for perforation. Persistent inability to get relief from medical treatment in the case of a proved ulcer means that it is a case for surgery.

What does that x-ray report on the colon mean? I suppose that a polyp in the lower colon could give that picture. Anything causing obstruction at the lower end of the colon could certainly give hyperperistalsis. That is as far as I am able to go. I do not think a diverticulum without obstruction could cause that picture.

Of course that blood streak in the vomitus in itself means nothing.

The fact that he had lost fifteen pounds in six months means a very great deal. People who

are nervous and constipated do not lose weight as fast as that unless they really are eating very little.

I do not know whether his mother's death from cancer means anything. Perhaps Dr. Mallory can tell us whether it does or not. I have gone through two phases, one in which I was sure that cancer in the family meant nothing at all, and more recently a feeling from reading the literature that there might be more likelihood of cancer in a person whose grandmother and aunt had cancer.

Dr. Tracy B. Mallory: There is not much to be said. It certainly is not definitely proved one way or another. An elaborate statistical analysis made in England showed that the maximum number of cases of cancer in any one family yet reported could be explained according to the theory of chance. On the other hand I do not think there is much doubt in most people's minds that a very marked history of cancer in a family is significant.

Dr. Fremont-Smith: There are very few families in which one can go back two or three generations and find no cancer.

I have two or three times been deceived by the feeling that the history of having gravel and having it relieved was the end of the picture. It very often happens that the trouble is not over. If there is gravel it is possible that there will be stones in the kidneys, silent, which may give no symptoms until a good many years later.

This is just the sort of story one would be tempted to call neurosis. We have the advantage of knowing that he died and that he probably died of these symptoms. Consequently I start out with the feeling that he did not have neurosis only. He may have had neurosis plus something else, but the something else was evidently serious. There is in this history a too definite progression of symptoms, and the symptoms suggest disease. Being wakened at night by pain, for instance, is a real thing. A neurotic is apt to worry, yet when he does get to sleep he sleeps thoroughly and comfortably. Then there is loss of weight and loss of appetite. Those two might be neurotic manifestations, but evidently he did not have a neurosis only.

A man of thirty-nine is too young to have a diastolic as high as 114. If that is correct we must take it as a serious finding. My hypothesis is that he has chronic nephritis. I am not throwing out the possibility of something in the kidney in the sense of stone. The chances are that he has a chronic prostate. A few white cells in the male are likely to be prostatic in origin. As for possible stone, he does not need to have red cells in the urine unless the stone is moving. If he had red cells here we might wonder whether they were due to nephritis or to stone in the kidney.

We have in that blood picture very slight secondary anemia and in the stool a strongly positive guaiac. The question is, is the blood in the stool from hemorrhoids or from higher up in the intestinal tract?

"The first and second portions of the duodenum filled readily and remained filled." That is not a usual finding. Usually they have difficulty in getting it filled and usually it is filled for just a moment. An irregular fleck of barium at the site of constriction means ulceration. It does not necessarily mean peptic ulcer; though sometimes it does. We very rarely get peptic ulcer as low as that. It may mean ulceration and carcinoma.

"The proximal duodenum was only slightly dilated," so it had not been a very long standing obstruction.

Dr. Holmes: We have had some cases in which we have seen an appearance like this that was due to a lesion in the pancreas with extension into the duodenum. The fact that we have a barium fleck in the region of the papilla suggests that the barium had gone into a dilated papilla or a dilated common duct. Such a description as this would suggest a lesion in the papilla, the common duct or the pancreas. It is very unusual to have an ulcer in that region.

Dr. Fremont-Smith: Should you expect such a lesion to cause obstruction at that point?

Dr. Holmes: Yes, it might cause delay. I should not feel at all certain about it.

Dr. Fremont-Smith: It fits in very well with it.

A Student: In that case wouldn't the barium be in the second portion of the duodenum rather than the third? The fleck was found in the third portion of the duodenum.

Dr. Holmes: The barium would be on the proximal side. Do you think the fleck is too far along to be in the papilla? Of course it is very difficult to be sure of the position of the first and second portion of the duodenum. A fleck in the third portion of the duodenum would be extremely rare. The only other thing I can think of is a diverticulum. That again would be very rare in the third portion of the duodenum.

Dr. Fremont-Smith: Would carcinoma in the lower portion of the duodenum with a little ulcerative area explain the picture?

Dr. Holmes: Yes, but a carcinomatous-like lesion would be more likely to be lymphoma.

Dr. Fremont-Smith: I should think with those findings that an exploratory operation would have been indicated.

Of course the slightest motion of his back would cause pain if he had metastasis to the vertebrae, so that there is a perfectly good explanation for the pain's coming on when he was moving. So far as the pain after worry or excitement is concerned, we know that there is no emotional change that is not accompanied by a

change in the body, and it is quite possible that with a very sensitive gastro-intestinal tract worry would cause spasm in the gastro-intestinal tract or increased peristalsis, causing some pain. I remember one patient who had a duodenal ulcer which was entirely symptomless. Lying in bed he picked up the *Transcript* on the day the stock market went out in 1929. As he looked at the headlines the pain in the epigastrium returned. I have no doubt that we should have found that the change in that duodenum was spasm. I do not think it was an imaginary thing at all. I think that story can be duplicated. Of course he is very manifestly neurotic. That again brings up the danger of feeling that that is all there is the matter with the patient.

In the interval between the second and third admissions he is developing obstruction.

The liver edge was felt on examination at the third admission. If we did not know that it was not felt five weeks before it would not look odd to us. It begins to look as though the liver were growing in size.

Sugar in the urine I do not know how to explain. I wonder if it is important. If it were important he would have a blood sugar. Of course that sugar may be very important in the light of a pancreatic lesion.

Bile in the blood can of course cause irritation of the kidney. Very often in jaundice we get albumin at least in the urine, sometimes red cells.

He is developing a more marked secondary anemia.

The icteric index and the van den Bergh are high.

I should think that without question we have evidence of malignant disease.

The fact that the mass in the epigastrium seemed to displace the stomach downward is very hard for me to explain. If we think, as we are thinking, of a lesion in the pancreas, the stomach would not be displaced downward unless the stomach were extremely low.

I should think the differential diagnosis would lie between (1) malignancy of the duodenum with metastasis to the liver and obstruction of the duodenum, ulceration causing blood, or more probably (2) carcinoma of the ampulla extending into the pancreas and of course into and up through the liver. It would be interesting to know the one thing they did not do, a liver function test, the dye test. In cases of interstitial carcinoma of the liver coming up from the ampulla along both ducts I believe the dye test is apt to give rather strikingly complete retention. Dr. Mallory will have to correct me again, but my picture of this situation would be cancer that would spread in through the ampulla and into the liver in a very diffuse way in contrast to the metastases that we should get from carcinoma of the stomach or pancreas, in which there is a great deal of good liver tissue left and the dye test does not give a zero figure; that is there is not complete retention of the dye. He may have had (3) primary carcinoma of the pancreas with metastasis to the liver and invasion of the duodenum. It seems to me that those must be the three differential diagnoses. I do not see just how to decide on any particular one, except that I think primary carcinoma of the pancreas is the least likely because one would expect generalized symptoms for a longer time, first with weakness, perhaps pain in the back. One would not expect pain in the abdomen until very late in the disease, unless there were changes in the duodenum. He was a pretty well man when he first came in with pain in the left lower quadrant. That pain I suppose could be duodenal pain, though I have never known duodenal pain to have that location. Of course most of the pain that we see in duodenal ulcer is from lesions high in the duodenum just below the pylorus, and that pain usually is felt in the epigastrium or in the back. I do not know where the radiation of the pain would be from low down in the duodenum. As I remember it, when Dr. Chester Jones investigated the gastro-intestinal tract with balloons dilated at various points in the tract he found the radiation of pain from the duodenum in the midline and just above the umbilicus. It was only in cases where there was some pathology like an appendix, adhesions following an appendectomy or other adhesions, that this pain was felt both in the median line and also in the region where the pathology was or had been. I do not understand the location of the pain. It would seem to me most likely that the lesion began in the duodenum, that is probably in the ampulla, and that what happened was that ulceration and constriction led to obstruction of the duodenum, progression into the liver and probably involvement of the head of the pancreas.

I also have a curiosity to know whether or not there were some stones in the kidney, because we so often do find stones in a kidney that has had stones once.

A STUDENT: Will you explain why you would not expect more jaundice earlier?

DR. FREMONT-SMITH: That is a good question. I do not see how we can explain that, because one of the first effects would be obstruction. I think that is a very definite argument against a primary lesion in the ampulla. The only other possibility that I can see would be carcinoma in the third portion of the duodenum, which Dr. Holmes tells us is very rare, involving later the ampulla and the pancreas, then the liver.

A STUDENT: Would you consider cancer of the transverse colon in this case? It often gives gastric signs.

DR. FREMONT-SMITH: I feel that we have

something too definitely localized to the duodenum and increasing under our eyes.

Clinical Discussion

AT STAFF CONFERENCE

Dr. Arlie V. Bock: The patient came into the hospital in an obviously very nervous, upset state, with the clinical appearance of a quite normal person. The interesting thing was that his pain was of such a nature that it was relieved within ten or fifteen minutes after the ingestion of a tablet called anacin, composed of quinine, caffein, acetanelid and aspirin. Each tablet contains three grains of acetanelid. He gave a story during the first two admissions of pain coming on after a cocktail or after emotional disturbance and so on. The fact that he had blood in the stool at that second admission completely escaped my observation and it was not called to my attention. Because of the whole background of this patient as discussed before, I felt that he ought to get some rest, and my advice was that he should spend some time in the country under medical care. He returned with a vastly different picture, an obviously sick man. The physical findings have been recorded. He entered on Saturday, developed jaundice on Monday and was explored on Thursday.

Dr. Aubrey O. Hampton: In this film, brought in by the patient, one or two diverticula are demonstrated in the sigmoid colon. Retained in the region of the duodenojejunal flexure there is also a rounded collection of barium which could be a diverticulum. This represents the first x-ray examination.

The second x-ray examination was done at the Phillips House. The colon alone was examined and the findings of diverticula were confirmed. His third x-ray examination was done in May, when a definite constriction of the third portion of the duodenum at the site of the diverticulum was demonstrated. Although we had never seen such a lesion of the duodenum secondary to disease in a diverticulum, it was thought that such a lesion was possible. At the fourth x-ray examination, two months later, there was a 30 per cent six hour residue in the stomach and the constricting irregularity of the third portion of the duodenum was still present. These films demonstrate the lesion and also the queer elongated retained fleck of barium. At the third examination we had no conference with the clinician. Two months later we did have an opportunity to discuss the case.

Dr. Bock: There is this to be said about that. Very few of his symptoms appeared to me to indicate a gastro-intestinal lesion. The character of his pain had nothing to do with his food and the pain was relieved by a simple medicine. The lesion described by Dr. Hampton in the third portion of the duodenum was quite new to me and I completely disregarded it.

Dr. Chester M. Jones: I took a complete history of this patient. I remember spending practically two hours trying to get a full history on him. I went over the x-ray report. I did not go over to see Dr. Hampton, but I talked over the x-ray report with Dr. Bock. I said that I had never seen a diverticulum cause pain such as that of which this man complained. The patient at this time seemed to be convinced definitely that worry, loss of sleep and so forth were the cause of his pain. I am sure we had no suspicion that a serious gastro-intestinal lesion was present. I think we usually go over to see the x-ray examination while it is in progress.

Dr. Hampton: I shall have to admit that one could not tell from my note what he might have. I did insist that he had something definitely wrong. I did not know to what it was due. At the last examination we all concluded that he had carcinoma of the pancreas which partially infiltrated and obstructed the duodenum.

PREOPERATIVE DIAGNOSIS

Carcinoma of the pancreas.

OPERATION

Gas and ether. The abdomen was opened through a six inch paramedian epigastric incision. The bleeding in the abdominal wall was slightly greater than normal, but not more so than was to be expected with a clotting time of more than eight minutes. Upon opening the abdominal cavity there appeared in the field numerous hard whitish peritoneal nodules varying from one to twelve millimeters in diameter. These nodules were scattered throughout both lobes of the liver and extended especially down the liver on each side of the gall bladder. The gall bladder was markedly distended. The regions of the cystic and common ducts were infiltrated with hard irregular masses. The pancreas was enlarged, hard and irregular from the tip of its tail to the tip of its head, extending up along the spine to a breadth of eight or ten centimeters. The pylorus was not obstructed, but the second and third portions of the duodenum were apparently bound down and narrowed by encroachment of the pancreatic tumor. The rapidity of the growth and the extensive involvement, causing obstruction to the common duct and the duodenum, made it seem unwise to attempt any palliative operation. A specimen was removed from the liver and one from the peritoneal surface of the round ligament of the liver. The wound was closed. At the conclusion of the operation the patient's pulse had gone from 120 to 140.

PATHOLOGIC REPORT

Metastatic adenocarcinoma.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Carcinoma of the pancreas.

DR. MAURICE FREMONT-SMITH'S DIAGNOSES

(1) Carcinoma of the duodenum with metastasis to the liver, or

(2) Less probably, primary carcinoma of the pancreas with metastasis to the liver and invasion of the duodenum.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Carcinoma of the head of the pancreas with invasion and ulceration of the duodenum and metastases to the liver, the lungs and the gall bladder.

2. *Secondary or terminal lesions.*

Thrombosis of the inferior vena cava.
Pulmonary embolism.

PATHOLOGIC DISCUSSION

DR. MALLORY: At autopsy we found in this case a cancer in the head of the pancreas which had invaded the duodenal wall and had ulcerated so that there was a fairly deep ulcer, 2 centimeters in diameter, directly into the pancreas. That is, I take it, the diverticulum-like structure which shows in the x-ray films.

DR. HAMPTON: The film shows a flat area which is probably the ulcer. I could not account for it in any other way than as a diverticulum, and diverticulum is very common there. In view of the autopsy findings I do not know that he ever had diverticulum.

DR. MALLORY: I cannot explain why the surgeons thought that the pancreas was so large, for the tumor was only half the size of a hen's egg and the body and tail were negative.

Further findings at autopsy were a very extensive thrombosis of the vena cava and a pulmonary embolus, undoubtedly secondary to operation. That was the immediate cause of death. Death occurred thirty-one days after operation.

A PHYSICIAN: What do you suppose was the cause of his jaundice, Dr. Mallory?

DR. MALLORY: There were diffuse metastases to the liver and lungs. The tumor had spread up the gastrohepatic omentum. The ampulla itself was not involved, but the common bile duct was definitely surrounded by tumor, and there were metastatic nodules high up in the ligament and in the liver itself, just where the hepatic ducts emerged from it.

The gall bladder also had a metastatic nodule in it with a small area of ulceration in the mucosa. That is something I have noticed several times; in fact there have been three cases within the past two years where we have not been able to decide whether we were dealing with primary cancer of the pancreas or of the gall bladder because both were uniformly involved. There seems to be some definite relationship which permits a cancer in one of those two organs to spread very quickly to the other.

The kidneys were negative. All the other organs were essentially negative.

The heart was quite small, weighing only 225 grams.

DR. HOLMES: Was there any evidence of diverticulitis of the colon?

DR. MALLORY: I find no note of it, Dr. Holmes. I think we were so impressed with the duodenum that we forgot to make any note of the sigmoid. I do not doubt that there was a diverticulum there, although thirty-nine is a little young for it. The majority of our cases have been in people of fifty and upward.

DR. HOLMES: In what portion of the duodenum was the ulcer located?

DR MALLORY: Just beyond the ampulla. We described it as the second portion. I think other people might call it the third.

Cancer of the duodenum is very rare except at the ampulla. We have had only four cases in six thousand autopsies. At the ampulla it is not very rare, although even there it is rather unusual. Of course the pancreas is one of the relatively much more common places for cancer, so that just on a statistical basis I think the argument ought to be weighted distinctly in favor of a pancreatic origin.

DR. BOCK: This is the most rapidly progressive malignant lesion I have ever seen, causing a great change in the clinical condition of the patient in a month's time. He left the hospital looking quite well and returned with all the earmarks of malignant disease.

DR. MALLORY: I had picked out for today a third case in which a diagnosis of psychoneurosis was originally made and the patient was sent to a sanitarium. Eventually he came to my hands and we found another cancer of the pancreas. Of course it is inevitable that such mistakes should occur from time to time, but I think it is worth while to bring up these cases to see if any suggestions can be made to avoid similar mistakes in the future.

DR. BOCK: There are two ways in which we could have avoided this mistake in diagnosis. We should have paid attention to two positive guaiac tests for occult blood in the stools, and we should have had a consultation with Dr. Hampton concerning the x-ray findings.

CASE 18122

GROSS HEMATURIA IN A MAN OF SIXTY-FOUR

Medical Department

PRESENTATION OF CASE

Dr. M. Morris Pinckney*: This patient was a sixty-four year old married white American male who entered the hospital complaining of dyspnea and slight palpitation of fifteen years' duration, swelling of the ankles and epigastric pain of three weeks' duration.

Fifteen years before admission, following a rather severe fall, he developed slight dyspnea on exertion and occasional palpitation of the heart. Three weeks before he came in he had sudden moderately severe abdominal pain which was in the left lower quadrant and lasted thirty-six hours. Following this he had dull epigastric pain, worse after meals, which persisted. He was frequently nauseated and occasionally vomited. Two weeks before entry he noticed dyspnea and was most comfortable sitting up in bed. At this same time his ankles began to swell. He had nocturia three to four times and his urine was grossly bloody.

Physical examination showed an elderly, slightly cyanotic, drowsy man with generalized arteriosclerosis. The heart was enlarged downward and to the left and there was increased cardiac dullness. His blood pressure was 220/95. His heart sounds were poor. There was a double murmur we believed at the aortic area. We were not sure, but we thought there was a thrill. There was an aortic regurgitant murmur. An electrocardiogram showed auricular premature beats, rate 90, low T waves and slurred QRS waves in all leads, low voltage.

Blood studies showed a moderate secondary anemia. The urine was acid in reaction, with a specific gravity of 1.020, a large trace of albumin, 15 to 20 white cells, no casts. The sediment was loaded with red cells. He continued to have bloody urine throughout his stay in the hospital. The non-protein nitrogen was 53 at admission and the renal function 5 per cent. A concentration test showed a specific gravity of 1.016 to 1.018.

During the first week in the ward he was digitalized and improved somewhat. He slept most of the day and night, using two or three pillows. The abdominal pain quieted down, though it was still present to a slight extent. He had no appetite. We inserted an inlying catheter because we thought he had residual urine, and found that he had. He seemed to be doing well. We hoped to be able to cystoscope him because we believed the gross hematuria was due to something in the bladder. We could not feel anything by rectum. After a week of the inlying catheter and bidaily irrigations with mercurochrome he developed acute epididymitis and his temperature shot up. From that point he grew rapidly weaker. His non-protein nitrogen rose to 75, 85, 95, 100 and 125. His heart sounds became poor. He became more dyspneic and had Cheyne-Stokes respiration. He was comatose the day preceding death. He died sixteen days after admission.

*Recently senior interne on the West Medical service.

Clinical Discussion

Dr. Pinckney: The discharge diagnosis was hypertensive heart disease, aortic regurgitation, possibly aortic stenosis, chronic nephritis, chronic epididymitis and right orchitis. I should say that the visiting physician was not sure that he had that type of heart disease. I put the diagnosis in on my own responsibility.

Dr. William Bradford Robbins: We considered rheumatic heart disease. There was no history by which we could go, but the sounds in the heart at the mitral area suggested a mitral lesion. Of course he was very weak and the heart sounds were faint, so it was difficult to say, but I was rather inclined towards a diagnosis of rheumatic disease. With definite signs at the aortic area, however, of arteriosclerosis and hypertension, we decided that it was hypertensive heart disease.

Dr. James H. Means: Why is it not perfectly typical cardiorenal disease with cardiac hypertrophy, renal hemorrhage and probably some degree of vascular nephritis? The mitral signs could be either functional or due to some sclerosis of the mitral valve I suppose. I should think the onset of congestive failure for the first time at this age together with the fact that there is no previous history suggesting rheumatic disease almost excludes that kind of disease.

Dr. Robbins: The fact was that he had a double murmur at the mitral valve, very suggestive of the mitral type.

Dr. Means: The diastolic part of that may have been an Austin Flint murmur.

Dr. Arlie V. Bock: How do you account for the sudden onset of pain? Why is it not more like an infarct?

Dr. Robbins: How about angina and cardiosclerosis? Of course it may have been the pain of infarct, but the signs were all those of a valvular lesion of some kind.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Hypertensive and arteriosclerotic heart disease.
Chronic nephritis.
Uremia.
Bronchopneumonia.

ANATOMIC DIAGNOSES

Chronic vascular nephritis.
Subacute glomerular nephritis.
Acute bacterial endocarditis.
Acute myocarditis.
Embolic abscess of the kidney.
Acute abscess of the prostate.

PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: This proved to be a very unusual case from the point of view of the renal findings. The kidneys grossly were enlarged, weighing 400 grams, but in spite of that enlargement the cortex was distinctly thinner than normal, measuring only 4 millimeters. The capsules stripped readily, leaving smooth, very pale yellow surfaces which were dotted with petechial hemorrhages. As a final gross finding there were a great many very minute abscesses one half to one millimeter in diameter. Obviously no one type of nephritis would explain these findings. Microscopic examination made it fairly evident that we must recognize three separate conditions here. The first was a mild vascular nephritis, evidently slowly progressive and of long standing. This was characterized by hyalinization of the majority of the arterioles and complete sclerosis of scattered glomeruli with surrounding foci of tubular atrophy and fibrosis. The remaining glomeruli in contrast showed many extremely acute lesions characterized by fibrin formation, nuclear proliferation and capsular hemorrhage. There seemed to be no transitional stages between the acutely inflamed and the totally fibrosed glomeruli. The persisting tubules showed extensive fatty degeneration. The small abscesses noted in gross appeared to be in the interstitial tissue and could not be connected either with the old vascular process or with the fresh acute glomerular nephritis. Their explanation was found in the examination of the heart, where we found an acute bacterial endocarditis on the aortic valve and several foci of acute myocarditis in the heart muscle.

The one additional finding of importance was an acute abscess of the prostate.

DR. BOCK: Was there no infarct of the spleen or kidney to account for that sudden pain in the flank?

DR. MALLORY: No. The only things we have to go with the bacterial endocarditis are the septic processes in the genito-urinary tract. There were abscesses both in the kidney and the prostate.

DR. ROBBINS: Do you believe that was an acute prostate?

DR. MALLORY: Yes.

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A NEW PITUITARY SYNDROME

IN a lecture given at the Yale Medical School, New Haven, Connecticut, February 24, 1932, Dr. Harvey Cushing called attention to a new syndrome connected with the pituitary gland. He pointed out that, although the clinical signs have been recognized for a number of years, they have not been definitely associated until recently with disease of the pituitary gland. In 1912, in Dr. Cushing's book on "The Pituitary Body and its Disorders" a patient was described (Case 45, page 217) showing an unusual symptomatology, presumably on a polyglandular basis. The chief clinical features were painful adiposity, particularly of the trunk and chest, without involvement of the extremities, rounded shoulders, amenorrhea, purple colored striae on the abdomen, hypertension, a tendency towards spontaneous ecchymoses and epistaxis, rough, dry skin, blue and dusky in appearance, pressure headaches with low-grade choked discs, fragility of the bones, and excessive growth of hair on the lips and elsewhere over the body. There seemed to be, at that time, rather definite evidence that a number of glands of internal secretion were involved and no particular attention was paid to the pituitary as the cause of her symptoms. Subtemporal decompression was done with some relief of the headaches.

Since that time this patient has been reëxamined and five other cases have appeared in Dr. Cushing's clinic. In addition, a number of reports of similar conditions have appeared in the literature, sometimes described as cases of polycythemia, spontaneous fractures, or adrenal disorders. In several of the patients no examination of the pituitary gland has been made, or if the examination has been made, a small tumor has not been particularly sought for. Within the last five years there have been, however, excellent clinical descriptions of this condition, with pathological reports*. The tumor found in each case was a small basophilic adenoma of the anterior pituitary gland, not large enough to cause definite changes in the sella turcica that could be studied by x-ray. Very recently Dr. Cushing has had a patient with a similar group of symptoms, who responded quickly to x-ray treatment of the pituitary gland, thus confirming what was already suspected, that these tumors would be susceptible to radiotherapy. The clinical aspect of this syndrome appears to be definite and the patients are easily recognized once the unusual group of symptoms is clearly in mind. All cases look very much alike (Fig. 283. Cushing, H. "The Pituitary Body, etc.", p. 219) and there are only slight variations in the symptomatology. The pathological findings, small as they are, seem to be consistently found when carefully sought for.

The syndrome, therefore, built up by carefully putting together scattered clinical references and pathological findings during the last twenty years, presents a definite picture of a disease unique in character and not previously described in great detail. It seems fitting, in view of the careful work done in elucidating this rare condition, that the disease should henceforth be known eponymically as "Cushing's syndrome."

*Teel, H. M. Basophilic adenoma of the hypophysis with associated pluriglandular syndrome. *Arch. Neurol. and Psychiat.* 26:593, Sept. 1931.

PUBLIC HEALTH ORGANIZATION

THE committee on public health organization of the section on public health service and administration of the White House Conference has recently issued its report. This committee functioned under the chairmanship of Dr. E. L. Bishop, Commissioner of Health of Tennessee; Surgeon General Hugh S. Cumming headed the section. A complete consolidation and transfer

of all major health activities of the Federal Government under one agency by congressional enactment was the important recommendation of the report, although it further stated that the creation of a Department of Health is not of vital importance. It also recommended that Federal grants in aid for health work throughout the Nation be increased and administered under the joint supervision of the Public Health Service and the State health authorities and through no other channels.

The functions to be included properly in an official public health service are stated to be now almost universally recognized as vital statistics, communicable disease control, hygiene of maternity, infancy and childhood; environment sanitation, sanitary control of milk and other foods, public health aspects of drug control, laboratory service for diagnosis, production and research; industrial hygiene, mental hygiene, health education, hospitalization of communicable diseases, cancer control and prevention of heart disease.

Assignment of personnel from the Public Health Service to other Federal agencies is considered to be particularly desirable when these agencies are conducting temporary health activities or activities incidental to but inseparable from their major functions.

The places in the Government where health is regarded as a major consideration are stated to be the Public Health Service, the Division of Vital Statistics, the Bureau of the Census, the health activities of the Division of Maternity and Infant Hygiene, and the Division of Child Hygiene in the Children's Bureau. A dissenting opinion was included by Grace Abbott, chief of the Children's Bureau, to the effect that the removal of the health work of the Children's Bureau would destroy it as a Children's Bureau, and that there must be a special organization for the promotion of the health of children.

It must seem obvious that so long as the Federal Government is undertaking health work that work should be centralized; preferably under an existing organization such as The Public Health Service.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

RISLEY, EDWARD H. A.B., M.D. Harvard University Medical School 1906. F.A.C.S. Member, New England Surgical Society. His subject is "Craniocerebral Injuries From the Point of View of the General Surgeon." Page 601. Address: Waterville, Maine.

BIGELOW, GEORGE H. A.M., M.D. Harvard University Medical School 1916. Doctor of Public Health, Harvard 1921. Prior to appointment in the Massachusetts Department of Public Health, acted as Medical Director, Antioch College, Yellow Springs, Ohio, and Director of Clinic of the Cornell University Medical College. Appointed Director of Division of Communicable Diseases, Massachusetts Department of Public Health, 1924. Appointed to present position as Commissioner of Public Health for Massachusetts, 1925. Address: State House, Boston. Associated with him is

LOMBARD, HERBERT L. A.B., M.P.H., M.D. Bowdoin 1915. Director, Division of Adult Hygiene, Massachusetts Department of Public Health. Address: State House, Boston. Their subject is "Hospitalization of Cancer in Massachusetts." Page 607.

MARVIN, FRANK WILLIAM. A.B., M.D. Harvard University Medical School 1914. Assistant Visiting Anesthetist, Boston City Hospital. Anesthetist, Newton Hospital, and Boston Psychopathic Hospital. Visiting Anesthetist, Whidden Memorial Hospital, Everett. His subject is "Avertin as a Basal Anesthetic." Page 609. Address: 520 Commonwealth Avenue, Boston.

TAYLOR, GRANTLEY W. A.B., M.D. Harvard University Medical School 1922. F.A.C.S. Surgeon to Outpatient Department, Collis P. Huntington Memorial Hospital. Assistant in Surgery, Massachusetts General Hospital and Harvard Medical School. Assistant Visiting Surgeon, Pondville Hospital. Address: 264 Beacon Street, Boston. Associated with him is

LUND, CHARLES C. A.B., M.D. Harvard University Medical School 1920. F.A.C.S. Surgeon to Outpatient Department, Collis P. Huntington Memorial Hospital. Assistant Visiting Surgeon, Boston City Hospital. Instructor in Surgery, Harvard Medical School. Address: 319 Longwood Avenue, Boston. Their subject is "Blood Pressure Fall Occurring in Avertin Anesthesia." Page 612.

RUSHMORE, STEPHEN. A.B., M.D. Johns Hopkins University Medical Department 1902. F.A.C.S. Secretary, Massachusetts State Board of Registration in Medicine. His subject is "The Bill To Register Chiropractors." Page 614. Address: 520 Commonwealth Avenue, Boston.

DAYTON, NEIL A. M.D.; DOERING, CARL R. M.D.; HILFERTY, MARGARET M. A.B.; MAHER, HELEN C. A.B.; DOLAN, HELEN H. S.B. For further information see This Week's Issue, page 592, issue of March 17, 1932.

BARNES, FREDERICK R. M.D. University of Pennsylvania 1913. Chief of Medical Service, Truesdale Hospital, Fall River. His subject is "Spontaneous Rupture of the Heart." Page

631. Address: 151 Rock Street, Fall River, Mass.

TARTAKOFF, JOSEPH. M.D. Tufts College Medical School 1929. Senior House Officer, Worcester City Hospital. His subject is "Horseshoe Kidney—Report of Unusual Form." Page 633. Address: City Hospital, Worcester, Mass.

The Massachusetts Medical Society

HAVE YOUR DUES FOR THIS YEAR BEEN PAID?

IN order that all Fellows of the Massachusetts Medical Society should continue regularly to receive their copies of the *New England Journal of Medicine*, the Treasurer of the Society announces that the mailing list of the *Journal* is being revised to eliminate the names of Fellows whose annual dues are unpaid. The Treasurer, therefore, hopes that those Fellows, who have not yet paid, will promptly send him their annual dues. This coöperation will assure continuance of the *Journal*.

CHARLES S. BUTLER, M.D., *Treasurer*.
8 The Fenway, Boston, Mass.

MASSACHUSETTS LEGISLATIVE NOTES

As the *Journal* goes to press, the Committee on State Administration has not reported on the Chiropractic bill.

The following bills have been given leave to withdraw:

SENATE 201—Petition of the Citizens Committee Opposing Compulsory Vaccination, by John S. Codman, Chairman, and another, that inoculation and vaccination be made voluntary.

HOUSE 284—Petition of Samuel B. Woodward and Edward J. Kelley for legislation to require the vaccination of children in private schools.

HOUSE 904—Petition of William Lloyd Garrison, Jr., that the public be protected from impure vaccine and that remedies be provided for the abuse thereof.

HOUSE 682—Petition of Herbert P. Shaughnessy for an amendment of the law relative to the sale of drugs and medicines.

HOUSE 874—Petition of John E. Daniels relative to notification and investigation precedent to discontinuance of compensation of employees injured in industrial accidents.

HOUSE 876—Petition of John E. Daniels for regulation of payment of compensation to employees partially incapacitated in industrial accidents.

HOUSE 911—Petition of the Boston Women's Trade Union League that employment of children under sixteen years of age be prohibited in certain occupations.

The following bill has been referred to the next annual session:

HOUSE 221—Petition of Fred W. Connolly that the dispensing of medicine by pharmacists and physicians be regulated further.

MISCELLANY

A RADIO MESSAGE PREPARED AND SPONSORED BY THE COMMITTEE ON PUBLIC EDUCATION OF THE MASSACHUSETTS MEDICAL SOCIETY FOR THE DEPARTMENT OF PUBLIC HEALTH

HEALTH IN INDUSTRY*

The era of great American industry began with the turn of the last century. At about this time, serious thought by a few state legislative bodies began to crystallize into investigative commissions on the proposition of care of the injured workman.

Our own Massachusetts General Court appointed the first such commission as early as 1903, but at that time no legislative action was taken. Workmen's compensation laws were enacted and in force during 1911 in about a dozen states including the Commonwealth of Massachusetts. Since then most of the states have followed.

When the financial burden of treatment and the compensation for injuries arising in the course of a workmen's occupation were placed squarely upon the shoulders of American industry, it was only logical that industry should make every effort to reduce the costliness of the law and its efforts in reducing the number and severity of industrial accidents have been most noteworthy.

With the advent of the compensation laws, industry turned to the medical profession for help and advice and soon throughout the land, most large industries had established medical departments of sorts—usually with a nurse in charge and with the miscellaneous equipment which would keep the establishment within the letter of the law. Crude, as were the early industrial medical departments, they proved their value to industry in reducing the accident cost.

During the past 25 years, accidents and industrial diseases have been reduced in the well-organized plants to about the irreducible minimum so that only one or two days per employee are lost for that reason.

Although there is no direct financial penalty upon an industry for employees' lost time due to sickness, yet these lost days have a bearing on production and the thoughtful executive has discovered that eight to twelve days per employee per year are lost for that reason. Translating these figures into plain English, it means that an industry employing 3000 persons could be manned by 2900 if there were no time lost on account of sickness.

*Broadcast February 4, 1932, Station WBZA, 4:50 P. M.

Therein lies one argument for industrial health activities.

The accident prevention problem has been conquered to a large extent by the administration of large industry, but the industrial health problem still looms as a major problem. However, the next quarter century will probably show advances in the management of industrial health problems, commensurate with the advances shown by accident prevention in the last.

What is to be the tentative program for these expected advances?

First, physical examinations of all entering employees, not for the rejection of anyone who is willing to work, but for the purpose of fitting him to a job which is within his physical limitations. Some are hired to work that the medical department finds should be under the care of their physician.

Secondly, annual or other periodic physical examinations thereafter the reason being that at least once a year the man may be warned of incipient disease or of some minor operation which will promote his comfort and prolong his life and usefulness.

Thirdly, maintenance of a diagnostic clinic. Because there is no cost to the individual, many men will avail themselves of its service, again giving the physician in charge an opportunity to apprehend incipient disease or to so place a man in the organization that he can still be efficient.

Fourthly, a pension scheme for aged employees, so that they need not run the hazards of overwork.

Fifthly, preventive minor surgery such as tonsillectomy, and removal of infected teeth.

Sixthly, a program of health consciousness among employees is most difficult, but constant impression on employees' minds that sickness is largely the individual's own responsibility must show results.

In this connection I want to read to you one of the health articles which will soon appear in our employees' magazine as a case in point. The title is:

"Why Am I Sick?"

If I become ill and unable to continue my work it is because

1. I have abused my stomach with improper food or drink either in amount or quality.
2. I have not had sufficient sleep.
3. I have failed to heed nature's signals of distress, without finding out whether they were serious or not.
4. I have failed to heed my doctor's advice.
5. I have failed to heed my dentist's advice.
6. I have rashly risked myself when there was no necessity for it.
7. I have taken unwarranted chances with my body.
8. I have worried and fretted about the future which may not come.
9. I have had no mental or physical recreation.
10. I have burned the candle at both ends.

or

11. Because of an act of God.

In this latter classification I am prone to place most of my illnesses, but probably no more than one-half of them can be legitimately so placed, viz.:

1. Malformations at birth.
2. Unavoidable contagious disease.
3. Cancer or tumor.
4. Hazards of fire, flood, storm, lightning or earthquake.
5. Poor hereditary strains, such as defective vision or tendency to tuberculosis, tendency to heart and kidney disease, defective teeth, etc.

The other half I am personally responsible for. In other words, barring acts of God, I am the master of my own ship until I am approximately sixty years of age.

My health is a matter of paternalistic guidance, and of my individual concern. By the term paternalistic guidance, I should be aware of the state's sanitary regulations of water, milk and food supply; of the state's quarantine; and other disease prevention activities. Upon the state's foundation, my individual health structure must rise.

After the age of sixty the natural disintegrating processes are apt to begin to manifest themselves but during my sane and sensible years from twenty to sixty, I should be able to so govern my actions that I could avoid at least half of my lost-time days due to illness.

Good health, as my inherent possession, is far too much taken for granted. Good health is a part of the struggle of life. Nothing worth while comes without effort. Good health is an asset without which few succeed. Without it our greatest of executives have failed when they were needed most.

How will my sick record read when I am up for a promotion? How well does my department's sick record compare with others? Am I doing all within my power to keep well? These are questions which I should constantly ask myself and for which I should earnestly seek answers.

RABIES QUARANTINE

All dogs in Belmont must be restrained for the next thirty days, because of an outbreak of rabies, in accordance with an order recently issued following a joint meeting of the selectmen and the members of the Health Board. This action was taken because of the behavior of a German shepherd dog that ran wild throughout the section. On being sent to the Angell Memorial Hospital, together with seven other dogs that it had bitten, autopsy showed that this dog had the disease.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1931 AND SEVEN YEAR AVERAGE

MONTH ENDING MARCH 5, 1932

Diseases	1932 Week ending Feb. 13	1932 Week ending Feb. 20	1932 Week ending Feb. 27	1932 Week ending Mar. 5	Average cases reported for week corresponding to Mar. 5 for past seven years	1931 Week ending Feb. 14	1931 Week ending Feb. 21	1931 Week ending Feb. 28	1931 Week ending Mar. 7
Anthrax	—	—	—	—	—	—	—	1	—
Cerebrospinal Men.	—	2	3	—	1	2	1	2	2
Chicken Pox	145	137	92	212	97	118	88	95	82
Conjunctivitis Inf.	1	—	—	—	—	—	—	1	3
Diphtheria	6	9	8	7	29	12	12	9	6
Dysentery Bacillary	—	4	—	—	—	—	—	—	—
Encephalitis Epid.	2	1	—	—	—	—	1	1	—
German Measles	6	12	6	3	42	3	10	6	6
Influenza	9	21	24	20	78	261	105	133	13
Measles	207	278	301	283	348	269	414	438	503
Mumps	64	106	74	95	103	65	96	52	90
Paratyphoid Fever	—	1	2	—	—	—	—	—	—
Pneumonia (Broncho)	32	42	38	54	43	53	63	53	57
Pneumonia (Lobar)	44	51	51	84	62	67	70	59	54
Poliomyelitis	—	—	1	—	—	—	—	—	—
Scarlet Fever	71	112	129	143	103	73	55	40	62
Septic Sore Throat	—	10	17	3	2	3	9	3	3
Smallpox	12	2	3	2	—	—	—	—	—
Tetanus	—	—	1	1	—	—	—	—	—
Trichinosis	—	1	—	—	—	—	—	—	—
Tuberculosis (Pul.)	22	28	17	27	28	22	8	13	38
Tuberculosis (O. F.)	3	2	3	1	2	3	2	1	3
Typhoid Fever	1	1	1	—	2	—	1	—	1
Undulant Fever*	—	2	1	—	—	—	3	—	2
Whooping Cough	134	129	90	153	67	71	47	35	95
Gonorrhea	28	77	35	40	32	18	25	20	24
Syphilis	42	63	30	56	38	16	37	36	42

*Made reportable August 14, 1928.

Remarks: No cases of Asiatic cholera, glanders, plague, and yellow fever during the past seven years.

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR JANUARY, 1932

The increase in the incidence of scarlet fever which began late in the fall has continued into January, the number of cases reported being almost at the maximum for this month.

Mumps, which has been showing the same trend, shows the highest number of cases ever reported in the State for the month of January.

Whooping cough and typhoid fever are slightly above the average for recent years.

Diphtheria has continued its downward trend, having for the fifty months in succession shown the lowest number of cases ever reported.

The incidence of measles, German measles, chicken pox and epidemic cerebrospinal meningitis is slightly below normal for this time of year.

Lobar pneumonia is likewise low, the number of cases reported being the second lowest since reporting began.

Tuberculosis, pulmonary and other forms, both continue their downward trend.

Anterior poliomyelitis and influenza occurred in about the number of cases expected.

RARE DISEASES

Anterior poliomyelitis was reported from Brookline, 1; Malden, 1; Newton, 1; Worcester, 3; Total, 6.

Dysentery was reported from Andover, 1; Leominster, 1; Wellesley, 1; Total, 3.

Encephalitis lethargica was reported from Quincy, 1; Salem, 1; Total, 2.

Epidemic cerebrospinal meningitis was reported

from Malden, 1; Newton, 1; Quincy, 1; Springfield, 1; Total, 4.

Septic sore throat was reported from Abington, 1; Boston, 9; Cambridge, 1; Chelsea, 1; Fall River, 1; Framingham, 1; Haverhill, 4; Lowell, 1; Newton, 1; Palmer, 3; Wareham, 3; Worcester, 1; Total, 27.

Smallpox was reported from Boston, 1; Fitchburg, 35; Gardner, 1; Leominster, 1; Pittsfield, 2; Total, 40.

Tetanus was reported from Salem, 1.

Trachoma was reported from Boston, 3; Brockton, 1; Worcester, 1; Total, 5.

MONTHLY REPORT OF CERTAIN COMMUNICABLE DISEASES

	Cases in Entire Pop.				Case Rates per 100,000 Pop.		
	Jan. 1932	Jan. 1931	Proso. Index*	Epi. Index†	Jan. 1932	Jan. 1931	Expected Rates‡
All Causes	10,324	10,658	—	—	240.2	249.2	—
Ant. Polio.	6	9	14	.4	.1	.2	.3
Diphtheria	259	330	485	.5	6.0	7.7	11.3
Ep. C. S. Men.	4	10	8	.5	.1	.2	.2
Measles	1603	2483	2958	.5	37.3	58.0	68.8
Pneu. Lobar	532	640	557	.9	12.4	15.0	13.0
Scarlet Fever	2027	1409	1433	1.4	47.2	33.0	33.3
Tbc. Pul.	316	382	360	.9	7.4	8.9	8.4
Typhoid Fever	19	14	16	1.2	.4	.3	.4
Whooping Cough	910	806	1113	.8	21.2	18.8	25.9
Chicken Pox	1269	1896	—	—	29.5	44.3	—
German Measles	58	143	—	—	1.3	3.3	—
Gonorrhea	680	632	—	—	15.8	14.8	—
Influenza	104	458	—	—	2.4	10.7	—
Mumps	1314	453	—	—	30.6	10.6	—
Syphilis	613	335	—	—	14.3	7.8	—
Tbc. Other	31	48	—	—	.7	1.1	—

*This index is an attempt to estimate the number of cases based on the trend during the past years which can be expected to occur, and is for the purpose of comparison with the number of cases which actually did occur.

†This ratio expresses how prevalent the disease is compared with the index mentioned above; 1.0 indicates that the actual number of cases equals the expected number. A larger number means a greater prevalence, and a smaller number a lesser prevalence than expected. Thus 2.0 would indicate twice the expected number, and .5 half the expected number of cases. The method used to determine the indices is described in the August 18, 1927 issue of the *Boston Medical and Surgical Journal*.

‡Calculated from the Prosodemic Index.

AN AWARD TO DR. STEPHEN J. MAHER

The Laetare medal, awarded by the University of Notre Dame, has been conferred on Dr. Stephen J. Maher who is an internationally known authority on tuberculosis. This medal has been given annually since 1885 on Laetare Sunday to some Catholic leader of the United States.

DR. RICHARD H. MILLER ADDRESSES THE CENTRAL LABOR UNION

Dr. Richard H. Miller, Assistant Professor of Surgery of the Harvard Medical School, addressed the Boston Central Labor Union on March 18. His subject was "Necessity and Advisability of Physical Examination."

DR. L. E. PHANEUF ADDRESSES THE RHODE ISLAND MEDICAL SOCIETY

Dr. Louis E. Phaneuf, Professor of Gynecology at Tufts Medical School, addressed the Rhode Island Medical Society on Thursday, March 3, on "The Interposition Operation in the Treatment of Uterine Prolapse."

MEETING OF THE BOSTON FEDERATION OF WOMEN'S CLUBS

This meeting was held on March 18 in the auditorium of the Y. M. C. A. and was comprised of clubs of the sixth district of Greater Boston. Dr. Herbert L. Lombard delivered an address on "Adult Hygiene," Harrison Eddy, Jr., on "Influence of Sanitation on Public Health" and "Red Cross Gray Ladies" by Mrs. William J. McDonald. Dr. George T. O'Connell, Director of the Division of Tuberculosis, Boston Department of Public Health, also spoke at this meeting.

Guests of honor were Mrs. Carl L. Schrader, State President; Mrs. Frederick E. Judd, and Dr. Anna C. Palmer, Health Specialist of the General Federation. The program included matters considered at the White House Conference.

DR. MAHONEY OBJECTS TO THE BILL BEFORE THE LEGISLATURE RELATING TO MILK

The proposed law which would shift milk inspection from the City Health Departments to the State Department of Agriculture would in fact abolish Boston dairy inspection, according to Dr. Mahoney,

Boston Health Commissioner. The adoption of this law, in his opinion, would be a serious nullification of certain activities designed to protect the milk which is distributed to this city. The progress made under the City Department of Health would seem to indicate that the opinion of the Commissioner should have weight with the Legislature in dealing with this particular problem.

DR. BIGELOW ELECTED PRESIDENT OF THE AMERICAN SOCIETY FOR THE CONTROL OF CANCER

On March 5 Dr. George H. Bigelow, Massachusetts Health Commissioner, was elected President of the American Society for the Control of Cancer. Other directors include Dr. Willis Fischel of St. Louis, Mo., and Dr. George Minot of Boston.

DR. JAMES A. KEENAN APPOINTED HYGIENE DIRECTOR

Dr. James A. Keenan was appointed Hygiene Director to succeed Dr. John A. Ceconi at a recent meeting of the Boston school committee. Since the death of Dr. Ceconi, Dr. Solomon H. Rubin has been Acting Director. His work has received special commendation from the School Committee and from physicians.

SPOT POND REQUIRES ATTENTION

By reason of very pronounced complaints by the citizens of Melrose, efforts are being made to improve the quality of the water drawn from this supply. It is reported that several tons of copper sulphate have been secured to be used in modifying the disagreeable taste of this water.

A BEQUEST TO THE NEW ENGLAND DEACONESS HOSPITAL

Under the will of Mrs. Edith W. Gallagher recently of Milton, wife of H. Clifford Gallagher, former president of the Baker Chocolate Mills, two bequests of $10,000 each to the New England Deaconess Hospital have been recorded. One gift is to be used for the benefit of persons suffering from diabetes, the other for those afflicted with cancer.

DR. HUGH S. CUMMING BEGINS HIS FOURTH TERM IN OFFICE

Dr. Hugh S. Cumming, Surgeon General of the Public Health Service, was sworn into his fourth term in that position on March 10.

NEW MEDICAL CENTRE

The New York Hospital's new medical centre, covering three square blocks along the East River between 68th and 71st Streets, will be opened September 1. New quarters will be provided for the Cornell University Medical College and a new psychiatric hospital together with a new children's hospital will be added to the city's medical facilities. The hospital in its new quarters will have a capacity of 1,000 beds. The New York Hospital now at 12 West 16th Street, the Lying-In Hospital, 2nd Avenue and East 16th Street and the Manhattan Maternity Hospital, 327 East 60th Street will all occupy quarters in the new plant and will close the doors of their present buildings soon. The Cornell University Medical College will begin to move as soon as its present term ends and will occupy the buildings adjoined to those of the New York Hospital on the York Avenue side of the centre.

RECENT DEATH

BLACKADER—The death of Dr. Alexander Dougall Blackader, Emeritus Professor of Pharmacology, Therapeutics and Pediatrics of McGill University, has been announced.

Dr. Blackader was one of the widely known physicians of Canada. He was the Editor of the *Canadian Medical Association Journal* for many years and was probably the oldest physician engaged in medical journalism in America at the time of his death.

He had many friends in the United States and gave a very interesting address at the celebration of the centennial anniversary of the *Boston Medical and Surgical Journal*, the change in name to that of the *New England Journal of Medicine* taking place at that meeting.

Dr. Blackader's death occurred on March 11 in his eighty-sixth year.

OBITUARY

RESOLUTIONS ON THE DEATH OF DR. SHERMAN RUSSELL LANCASTER

At the last regular meeting of the Belmont Medical Club, held at All Saints Parish House, Belmont, Mass., February 26, 1932, the following resolution of condolence on the death of Dr. Sherman Russell Lancaster was adopted:

"*Whereas* on the death of Dr. Sherman Russell Lancaster on January 26, 1932, the Belmont Medical Club has lost a valuable member, a kindly man in his social relations and a physician ardent in his professional activities; it is hereby

"*Resolved*, that this club, appreciative of his qualities as a physician and colleague, places on record a deep sense of its loss and be it further

"*Resolved*, that the Belmont Medical Club tends to the members of his family its heartfelt sympathy and that these resolutions be communicated to them, be printed in the *New England Journal of Medicine* and inserted in the records of this club."

Frank J. Fleming, M.D.
Stephen J. Malone, M.D.

NOTICES

BEWARE OF A MAN WHO IS SOLICITING ORDERS FOR MEDICAL SUPPLIES

Report has been sent to the *Journal* that a man is visiting doctors with offers to sell medical supplies at abnormally low prices. He gets a money deposit and is not heard from again.

THE CUTTER LECTURE ON PREVENTIVE MEDICINE

By Charles Armstrong, M.D., National Institute of Health, U. S. Public Health Service, Washington, D. C.

The Complications of Smallpox Vaccination.

Thursday, March 31, 1932, at the Harvard Medical School, Amphitheatre Building E, 5 P. M.

These lectures are given annually under the terms of a bequest from John Clarence Cutter, whose will provided that the lectures so given should be styled the Cutter Lectures on Preventive Medicine and that they should be delivered in Boston and be free to the medical profession and the press.

The medical profession, medical and public health students, the press and others interested are cordially invited to attend.

A MEDAL FOR DR. BUIZARD

The friends and associates of Dr. Charles Buizard, Secretary General of the Surgical Society of Paris, are planning to present a bronze medal to him. Members of the Committee extend to the friends of Dr. Buizard in this country an invitation to subscribe. Each subscriber of not less than 100 francs will receive a bronze replica of the medal. Subscriptions may be addressed to MM. G. Doin and Co., editors, 8, place de l'Odeon, Paris (6e).

MEDICAL CLINIC AT THE PETER BENT BRIGHAM HOSPITAL

At 3:30 P. M., on Thursday, March 31, in the Amphitheatre of the Peter Bent Brigham Hospital, a medical clinic will be given by Dr. Henry A. Christian, to which physicians are cordially invited. The clinics will be held regularly on Thursday afternoons.

PRELIMINARY ANNOUNCEMENT OF THE THOMAS W. SALMON MEMORIAL LECTURES

To Be Delivered by Dr. Adolf Meyer, Professor of Psychiatry, Johns Hopkins University, Director of the Henry Phipps Psychiatric Clinic, Baltimore, at the New York Academy of Medicine, Friday Evenings, April 8, 15 and 22, 1932, at 8:30 P. M.

The first series of The Thomas W. Salmon Memorial Lectures will be given at The Academy of Medicine in New York City beginning April 8. The lecturer will be Dr. Adolf Meyer of Baltimore, who was chosen by the committee in charge of the lectures in recognition of his services to American psychiatry and his eminence as a scientist and teacher in this branch of medicine.

The Thomas W. Salmon Memorial Lectures were established in honor of the late Dr. Thomas W. Salmon, Professor of Psychiatry of Columbia University and the first Medical Director of The National Committee for Mental Hygiene. Dr. Salmon was a leader in mental medicine and did more in his day to advance the care and treatment of the mentally ill in this country than perhaps any other one professional man. His direction of the mental hygiene movement from the beginning was largely responsible for making it the social force it is today, influencing every field of human endeavor.

Shortly after his death his friends and associates formed The Thomas W. Salmon Memorial Committee, which raised an endowment fund of $100,000 as a permanent memorial in his honor for the advancement of psychiatry and mental hygiene, and each year an outstanding worker in these or related fields will be selected to give the Salmon Lectures, which form the main activity of the memorial. The lectures will be given in various cities in different years under the auspices of accredited scientific, medical or educational organizations. The New York Academy of Medicine administers the fund and the lectures.

The Thomas W. Salmon Memorial Lectures are the first of their kind to be established in the history of American medicine and have been called "the Nobel Prize of American Psychiatry". It is the purpose of the lectureship to stimulate and encourage original research and study in mental hygiene and psychiatry and to honor in this way those who are making outstanding contributions to scientific advancement in these fields, in this country or abroad.

The first award went to Dr. Adolf Meyer, Professor of Psychiatry of Johns Hopkins University and Director of the Henry Phipps Psychiatric Clinic in Baltimore. Dr. Meyer is one of the world's outstanding psychiatrists and a pioneer in mental hygiene.

Dr. Meyer will lecture on three successive Friday evenings, April 8, 15 and 22. All of the lectures will be given at The New York Academy of Medicine, 2 East 103rd Street, New York, N. Y., and will start at 8:30 P. M. sharp. Dr. Meyer's subject will be "Psychobiology." In his first lecture he will discuss the relations of mental and general medicine and will describe the position of psychobiology with reference to medicine and its associated sciences.

The second lecture will present a concrete picture of some specific problems such as, for example, the schizophrenic reactions, with a statement of the essentials of Dr. Meyer's findings and the deductions to be drawn from his studies for a fundamental understanding of psychiatric diseases in general.

The third lecture will be devoted to an exposition of what is being done and what can be done in psychiatric therapy. The relationships of psychiatric therapy with the psychoanalytic and other therapeutic approaches will be defined, and a clear picture will be formulated as to present-day thought and practice in the field of psychiatry.

BIOGRAPHICAL NOTES ON DR. THOMAS W. SALMON

Born in Lansingburg, New York, January 6, 1876.
Graduated from Albany Medical College, 1899.
Private medical practice, 1899-1901.
Medical staff, Willard (N. Y.) State Hospital, 1901-1903.
Commanding Assistant Surgeon and Past Assistant Surgeon, U. S. Public Health Service, 1903-1915.
Chairman, New York State Board of Alienists, 1911.
Director of Special Studies, The National Committee for Mental Hygiene, 1912-1915; Medical Director, 1915-1921.
Senior Consultant in Neuropsychiatry, A. E. F., 1917-1919. Brigadier General, Medical Reserve Corps, U. S. Army, Awarded D. S. M.
President, New York Psychiatrical Society, 1920-1921.
Professor of Psychiatry, Columbia University, 1921-1927.
Consulting Psychiatrist, Presbyterian Hospital, 1922-1927.
President, American Psychiatric Association, 1923-1924.
Died August 13, 1927.

BIOGRAPHICAL NOTES ON DR. ADOLF MEYER

Dr. Meyer is the Director of the Henry Phipps Psychiatric Clinic of Johns Hopkins Hospital which he planned and organized in 1913, and has been a leader in the development of his specialty in this country for many years. He received his early medical training in Switzerland, taking his degree at the University of Zurich, and after postgraduate study in various medical centers in Europe came to the United States in 1892. He served in the state hospitals of Illinois and Massachusetts, and taught psychiatry and neurology at the University of Chicago and at Clark University. Subsequently, he entered the New York State Hospital service and reorganized the State Psychiatric Institute, the research center of the state hospital system, serving as director of that institution until 1913. From 1904 to 1909 he was Professor of Psychiatry at Cornell University. He is a past President of the American Psychiatric Association and the American Neurological Association. His scientific contributions cover a wide range of subjects dealing with fundamental aspects of psychiatry, neurology, psychobiology, mental hygiene and related fields.

RADIO HEALTH MESSAGES

MARCH, 1932

Sponsored by the Public Education Committee of the Massachusetts Medical Society and the Massachusetts Department of Public Health.

Courtesy WBZA. Tuesday at 5:00 P.M.

March
29 Rose Cold and Hay Fever

STATE HOUSE BROADCAST

Sponsored by the Massachusetts Department of Public Health.

Courtesy WEEI. Fridays at 12:30 P.M.

Health matters of public interest discussed by the Division Directors of the Department.

RADIO HEALTH FORUM

Queries from the public are answered under the sponsorship of the Department of Public Health.

Courtesy WEEI. Fridays at 4:50 P.M.

Questions on Health and Prevention of Disease may be sent to Radio Health Forum, State Department of Public Health, State House, Boston.

REPORTS AND NOTICES OF MEETINGS

THE GREATER BOSTON MEDICAL SOCIETY

The regular meeting of the Greater Boston Medical Society was held in the amphitheatre of the Beth Israel Hospital on March first. Dr. Louis J. Ullian presided as chairman.

The address of the evening was given by Dr. Eli Moschcowitz of the Mt. Sinai Hospital, New York City, on the subject "A Biological Concept of Disease."

He has observed the various manifestations of several disease processes, and has concluded that many chronic diseases are not sharply defined but have many transitional stages. Diseases should therefore be classified on the basis of pathogenesis rather than on the signs presented. Most of the present confusion arises from the lack of knowledge of the causes of disease. The many "disease sports" have been noted. This difficulty arises from the fact that in the hospitals only the late stages of the chronic diseases are observed, while the practitioner rarely avails himself of his opportunity to study disease in its earlier stages.

Two classes of chronic diseases may be distinguished—those with definite pathogenesis, and with syndromes. The removal of diseases from the latter class will tend to unify and simplify the understanding of the disease process. This unification will be assisted by careful notation of the stage of the disease observed by the physician. Medical statistics often mean nothing because this has not been done.

To illustrate the importance of pathogenesis Dr. Moschcowitz discussed hypertensive disease, Graves' disease and toxic hepatitis.

Hypertensive disease may be considered with respect to the renal lesions accompanying it. They are now known to be only of two types, arterio-

capillary fibrosis, and glomerulonephritis, in contrast to the older concepts of many additional kinds of nephritis.

Arteriocapillary fibrosis is the result and not the cause of hypertension. The reason why many types of renal lesions were noted in hypertension is that in many cases the patient did not die a renal death. That is, the evolution of the renal lesion was not complete. The kidney at autopsy merely represented a local expression of general arteriosclerosis.

Arteriosclerosis is the result either of long-continued normal blood pressure, or of hypertension. The proof that hypertension causes arteriosclerosis is obtained from observation of the variations in the greater and lesser circulations. In the pulmonary circulation it is clearly observed that increased pulmonary pressure causes sclerosis of the pulmonary artery.

The clinical expressions of arteriosclerosis are manifested in many organs, including the brain, retina, heart, pancreas, kidneys, and extremities. Often one organ bears the brunt of the pathological change.

The cause of hypertension is unknown, but probably is psychic in nature. Hypertension is increasing in incidence because of the increasing number of stresses and strains in modern civilization.

The second type of kidney lesion, glomerulonephritis, after the initial acute attack, may progress in several ways. There may be complete anatomical and clinical recovery; there will be no recurrence of the nephritis in these cases, according to Dr. Moschcowitz. Chronic glomerulonephritis, with the clinical picture of malignant sclerosis, is a second possibility. Many cases are left with nothing except an albuminuria resembling the orthostatic type, except that the morning urine is not entirely free of albumin. Death occasionally results in the acute attack from myocardial failure. Occasionally the lesion progresses to subacute glomerulonephritis, with death in anuria, or to the nephrotic phase.

The term "nephrosis" is undesirable. It is now fairly well accepted that all such cases must fulfil Epstein's definition. At death four lesions have been noted. They are lipoid degeneration, chronic parenchymatous nephritis, amyloid kidney, and, by far the most common, glomerulonephritis. That is, nephrosis is a syndrome. It can better be understood as hypoproteinosis, since the edema is due to the loss of protein. The cause of Epstein's primary nephrosis is still unknown, but the lipoid degeneration very probably may be secondary to some other cause.

Hypertension in the pulmonary circuit follows the same course as in the greater circulation. The chief difference is that only two organs are involved in this case. The causes are mitral stenosis or regurgitation, emphysema, failing left heart, pulmonary fibrosis, patent ductus arteriosus, kyphoscoliosis, and open congenital valves. The results are arteriosclerosis of the pulmonary artery, pulmonary arteriocapillary fibrosis, right heart failure, pulmonic insufficiency, pulmonic infarction, passive congestion of liver, spleen, and kidneys.

Graves' disease is apparently the end result of a disease process which is first manifested as autonomic imbalance, then forme fruste, and then by fully developed Graves' disease. Hence the basal metabolic rate determination becomes a method of determining the activity of the disease rather than of making the diagnosis. This progression has been observed in several patients, all of whom have a special type of personality characterized by emotional instability. Eighty per cent of the cases of Graves' disease originate in psychic trauma. If unchecked it will lead to cardiac failure or to acute thyrotoxicosis and death.

Toxic hepatitis may be manifested either by catarrhal jaundice or by acute yellow atrophy. Both of these lesions have the same pathogenesis, Dr. Moschcowitz believes. It is possible that biliary cirrhosis may be included in the same group.

The same method of study could be applied with profit to many other types of diseases. Thus those associated with disturbances of fat metabolism, amaurotic family idiocy, Pick-Niemann disease, and Christian's disease, seem to be interrelated.

A DISCUSSION OF PROGRESS IN RESEARCH AND INTERESTING SURGICAL CONDITIONS

The Department of Surgical Research and the Harvard Surgical Teaching Service of the Boston City Hospital held a clinical meeting in the surgical amphitheatre on February 18. Progress in research and several interesting surgical conditions were discussed.

Dr. Earl R. Lehnherr discussed "Chemical Findings in Arteriosclerotic Blood Vessels." He has analyzed sections of aortas from diabetics and normal patients. He found that the deposition of calcium is increased in relation to the cholesterol. The first change noted in the process of arteriosclerosis is a change in the permeability of the intimal layer. The cause of this change is unknown. There follow in order, infiltration and deposition of fats, autolyses of fats, decomposition of calcium soaps leaving calcium phosphate and carbonate, and, finally, decomposition of proteins, possibly with combination of the products with calcium.

In the diabetic there is an exaggerated deposition and an increased amount of arteriosclerosis, although the factors producing it are presumably the same as in the normal person. It is important carefully to prevent acidosis and hyperglycemia since these seem to be causative factors.

Dr. J. Edward Flynn spoke on "Bile Peritonitis with Special Reference to Blood Chemistry." The report embodied experimental results obtained from the production of bile peritonitis in dogs.

It is not known whether peritonitis produced by rupture of the gall bladder is due to the bile itself or to bacteria present in the bile. To investigate the problem, in one series of dogs the gall bladder was opened freely, in another group nephrectomy

was done in addition, and in a third, bile was removed from the gall bladder, autoclaved, and injected into the peritoneal cavity.

The symptoms of bile peritonitis observed were fever (about 104° F.), rapid pulse becoming irregular, increased breathing changing into Cheyne-Stokes, weakness, lethargy, and coma. Abdominal pain, tenderness and rigidity, especially in the right upper quadrant were noted. There was a gradual increase in the white count, and bile appeared in the urine. Bile cultures were negative except in two cases, when B. Welchii was found. The same organism was recovered from the peritoneal exudate in four cases at autopsy.

The blood changes were compatible with severe liver and kidney damage. Acute nephritis was observed in about half the cases at autopsy. It was concluded that bacteria did not modify the course of bile peritonitis if there was sufficient bile to cause death within 24 hours.

This paper was produced in collaboration with Dr. Stephen J. Maddock, who presented a companion report on "The Effects of Complete Liver Removal." He has found that hepatectomy produces a hypoglycemia, rapidly causing convulsions, while amino acids and uric acid rise in the blood. Urea ceases to be formed. The animals die in 12 to 24 hours of an unknown cause even if sufficient glucose is supplied.

If the kidneys are removed at the same time, the blood uric acid rises in dogs, while the urea rises excessively.

Dr. Charles C. Lund presented two cases of peripheral aneurysms, which had been successfully treated surgically. The first case was an adult male who complained of pain and weakness in the left leg. There had been no previous injury, and the Wassermann was negative. A pulsating tumor was found just below Poupart's ligament, from which blood was obtained on tap with a fine needle. There was a white blood cell count of 23,000, and a slight temperature.

When all had been prepared for operation it was observed that the tumor was no longer pulsating, that the foot was cold, and that the dorsalis pedis could no longer be felt. It was believed the aneurysm had thrombosed. Two days afterward the tumor became hot. On tap, pus and blood were withdrawn, which on culture grew a pneumococcus, type VII. The abscess was opened, and a dissecting aneurysm found. The patient has recovered except for fairly complete paralysis of the femoral nerve, which was present on admission.

The second patient was an ex-soldier who had had many gunshot wounds with widespread osteomyelitis. He had noticed increased size of his left leg for a year with a buzzing sensation behind the knee. A loud thrill and murmur, with an enlarged heart, made the diagnosis of an arteriovenous aneurysm. The sac was dissected out and an end-to-end suture of the artery made. There has been complete cessation of symptoms since operation and some decrease in the size of the heart.

Dr. Irving J. Walker discussed "Hernia Into the Prevesical Space." Only three definite cases of this type are reported in the literature. Dr. Walker has observed two more.

There are three types of hernia which can develop in the supravesical fossa, which is the triangular area of peritoneum bounded laterally by the obliterated umbilical arteries, and below by the peritoneal reflection from the bladder. Most commonly the hernia develops just lateral to the rectus muscle, pointing outward and laterally. A second type points immediately below the rectus. The uncommon prevesical hernia is located in the space of Retzius between the anterior wall of the bladder and the abdominal wall.

The first patient, a male, 51 years of age, complained of cramp-like abdominal pain for 4 days, followed by foul vomitus, obstinate constipation, and frequency of urination. On physical examination an inguinal hernia was found which was not incarcerated. The diagnosis of acute intestinal obstruction was made. On operation a loop of strangulated ileum was found extending two inches into the prevesical space. The sac was tied off, and convalescence was uneventful.

The second case, a 62-year-old male, also presented the symptoms of acute intestinal obstruction. He had had some increased frequency for years. Increased peristalsis, and a non-strangulated inguinal hernia were observed. On operation a loop of ileum was found incarcerated in the prevesical space. Recovery followed after resection and jejunostomy.

Diagnosis is difficult. The presence of frequency, if other causes can be eliminated, combined with the symptoms of strangulation or acute intestinal obstruction is suggestive. Cystoscopic examination might be valuable but hardly seems justified.

Dr. Stanley J. G. Nowak discussed "Experimental Studies in Spinal Anesthesia." A large number of experiments were made on cats to attempt to determine the cause of the fall in blood pressure, and the mechanism of sudden death after spinal anesthesia.

Several theories have been advanced to explain the fall in blood pressure. It has been suggested that there is a lack of muscular tone with peripheral blood stasis under spinal anesthesia. However, muscular relaxation after ether or complete paralysis in experimental poliomyelitis is not associated with a fall in blood pressure while there is a fall after spinal anesthesia in a monkey with chronic poliomyelitis when the only mechanism to be affected was the sensory apparatus.

Others believe there is a dilation of the splanchnic vessels with retention of blood in this system. This cannot be the sole cause, for if the splanchnic vessels are ligated at the point of origin, there is still a very marked fall of blood pressure after spinal anesthesia. Also portal venous pressure tracings

showed no appreciable change after spinal anesthesia.

Blood volume determination by the Rowntree and Geraghty method showed no change in an experiment illustrated with a slide which showed a fall in blood pressure. A series of determinations should increase in volume in a large group, no change in the same number, and a decrease in a small number. These inconsistent findings pointed to a vasomotor instability.

A third theory, at present under investigation, ascribes the fall in blood pressure to cerebral anemia.

Dr. Nowak showed that an animal dying accidentally from the usual experimental dose of novocaine exhibited respiratory failure and at autopsy showed that the anesthetic solution (colored by gentian violet) extended up to the fourth cervical level, suggesting death from phrenic-intercostal paralysis. Deliberate limitation of spinal anesthesia to this region, however, did not always produce death, neither did bilateral phrenic avulsion together with anesthesia of all the intercostal segments.

Subcutaneous and intramuscular injections of novocaine failed to create any fall in blood pressure. Intravenous injection, however, produced a fall usually greater than an equivalent amount injected intraspinally. It was accompanied by respiratory death and, sometimes, circulatory collapse after lethal doses. These phenomena suggested venous absorption of novocaine from the spinal fluid. Such action was corroborated by the recovery of phenolsulphonphthalein as well as novocaine in the urine after subarachnoid injection in both animals and man. In man the excretion of novocaine was most marked and more rapid when the fall in blood pressure was most pronounced.

Dr. Nowak concluded that the presence of novocaine in the blood stream would account for the depressor reaction by its direct action in the heart muscle and for the respiratory disturbances by action in the medullary center.

Dr. Augustus Riley reported on "Conservative Kidney Surgery." Abnormalities of the kidneys are not uncommon. Occasionally due to the development of pathology in such a portion it is possible to remove it, leaving the normal part intact. -Such opportunities are uncommon but occur frequently enough to necessitate study of each case.

A case of tuberculosis of the upper calyces of a double kidney was treated in this manner. The three lower calyces and the pelvis appeared normal by x-ray. On operation a thin-walled abscess of the upper pole, about an inch in diameter, was found. The upper third of the kidney was removed, and the cut edges of the remaining portion approximated with catgut. The drain was removed six days after operation, and recovery was uneventful.

Dr. Frank W. Marvin spoke on "Avertin as a Basal Anesthesia." It is a rapid, effective anesthetic, and extremely satisfactory from the patient's point of view. It is contraindicated in cases in which the operation itself will produce shock, in hypertension, in acute or chronic nephritis, or liver disease. The postoperative fall in blood pressure is its chief disadvantage. It can be compensated for by ephedrine. It is toxic in large doses; most deaths have been due to overdosage.

Dr. Robert Aldrich discussed the "Treatment of Burns with Special Reference to Gentian Violet." It was previously believed that the symptoms of burns were due to toxins absorbed from the damaged tissues. Later experiments tend to show that none are absorbed from the burned area.

Many of the symptoms are due to dehydration. The mortality can be lowered by forcing fluids. Many patients die from the primary shock. Most of the deaths, however, occur after 72 hours. To determine the cause of these deaths, a bacteriologic study of burns was made. It was found that after 12 hours, beta or gamma streptococci could be grown consistently from the lesion. Blood cultures obtained after the usual temperature rise about 4 days after the burn frequently showed hemolytic streptococci.

Since gentian violet is strongly bactericidal for all gram positive cocci it was decided to paint burns with it. It has been found that patients under this treatment are not toxic, and take food and fluid much better. Changes in the blood chemistry such as is produced by dehydration do not occur.

The method of application is as follows: A one per cent solution of gentian violet is sprayed directly on the dirty burn every two hours until an eschar is formed. It is then sprayed on every four to six hours until healing occurs. The eschar can be removed by saline. Epithelium grows well beneath it. If the patient presents himself after infection has occurred, the areas are sprayed and the eschar removed each day.

Dr. William A. White, Jr., and Dr. Edward A. Cooney spoke on "A Non-Operative Treatment of Carbuncles." They pointed out that the carbuncle is a cellulitis which breaks down with abscess formation. This course apparently is hastened by the injection of non-specific proteins.

To compare the effectiveness of the surgical treatment with that of protein injections, the length of illness of 200 cases treated by one or the other method was obtained. It was found that there was no significant difference in the case of a small carbuncle, but that in the case of large carbuncles, the length of illness when surgery was used, 74 days, was shortened to 45 days when protein therapy alone was employed.

In this clinic Aolin was used as the protein. An average of four doses was used for the very large carbuncles. Local injections were made for psychic reasons. Pain was relieved by the treatment. Diabetes responded satisfactorily.

SUFFOLK DISTRICT MEDICAL SOCIETY

A clinical meeting of the Suffolk District Medical Society was held at the Children's Hospital, on

Wednesday evening, February 24, 1932. Dr. Reginald Fitz presided.

Dr. W. E. Ladd and his associates discussed some aspects of ulcerative colitis. Dr. L. D. Fothergill spoke on the medical treatment and bacteriology of the disease. In the absence of any generally accepted specific therapy medical treatment must be largely symptomatic and supportive. Good general hygiene should be maintained and a low residue diet is advisable. Severe diarrhea may be decreased by the use of opiates or bismuth preparations in some cases. Recently a proprietary drug, Yatren, has been shown to be a specific in amebic dysentery and some reports state that it is valuable in the treatment of ulcerative colitis but Dr. Fothergill believes that the results may well be due to errors in diagnosis. Colonic irrigations are no longer recommended and may, in fact, be harmful in some cases. The diet should have an adequate vitamin content in this as in any other chronic disease although there is little evidence in support of the theory that ulcerative colitis is a vitamin deficiency disease.

Chief among the many bacteria advanced as the etiologic agent is the diplococcus described by Bargen and Logan. These workers are able to isolate the organism in ninety to ninety-five per cent of their cases as is also Dr. Fothergill in the cases seen at the Children's Hospital. Bargen claims that he is able to produce the disease experimentally in rabbits. Large doses of fresh broth cultures are injected intravenously and subsequently fifty per cent of the animals develop diarrhea and bloody stools and show ulcerations of the mucosa of the large bowel at postmortem examination. Dr. Fothergill believes that these are embolic lesions with secondary ulceration similar to those seen in children with overwhelming septicemias, and that the experiment does not prove that the Bargen organisms are specific etiologic agents in ulcerative colitis. Autogenous and stock vaccines have been used with good results by Bargen but other workers including those at the Children's Hospital have failed to confirm his results. Recently Bargen has produced a concentrated antiserum but as yet he has not conclusively proved its value.

Dr. Sidney Farber demonstrated two pathologic specimens. The changes depend on the severity and duration of the individual case and vary from small superficial ulcerations to extensive deep lesions that extend down to and through the muscularis and may even perforate. One specimen showed the extensive changes found in a severe case. The other was from a boy who had had ulcerative colitis associated with the presence of a streptococcus hemolyticus in the stools for a period of six years. He developed a mass in the left upper quadrant which was found to be an adenocarcinoma at operation. One can only speculate as to the relation of the streptococci to either the ulcerative colitis or the malignant degeneration in this case.

Dr. W. E. Ladd discussed the surgical treatment of the disease. Of sixteen cases at the Children's Hospital nine were treated surgically. If careful medical treatment fails an ileostomy is done and the fecal stream diverted from the large bowel. Diarrhea and bloody stools will then cease and when the disease has been quiescent for approximately two years the ileostomy is closed. One patient died of peritonitis following the second operation after having been symptom-free for three years. This was a number of years ago and with the present improved technique such an outcome is very unlikely. Another died of peritonitis resulting from perforation of the ulcerative process soon after the primary operation. The third fatal case was the boy who developed adenocarcinoma after having the disease for six years. A fourth patient had the disease for two years before an ileostomy was done. There was then prompt relief of the symptoms and a marked gain in weight. After two years the ileostomy was closed and the patient has now been symptomless for three years. Four patients have been completely relieved for periods of months following the primary operation and are awaiting the closure of the ileostomy after a sufficient time has elapsed. The ninth patient was only recently operated upon and still has symptoms referable to the large bowel. Of the seven medically treated cases, five are unimproved and two have not been followed.

Dr. Ladd feels that there has been undue pessimism concerning the surgical treatment of ulcerative colitis and that there is a good chance for a permanent cure provided operation is not delayed until severe damage has been done. He would advise ileostomy after a year of unsuccessful medical treatment.

Dr. K. D. Blackfan spoke on "The Complications and Sequelae of the Common Cold." The primary etiologic agent of the common cold is a filterable virus which is responsible for the early transitory symptoms and so damages the mucous membranes that normal bacterial inhabitants of the upper respiratory tract are able to produce disease. In addition pathogenic organisms may be introduced. This conclusion is based on the observation that bacteria free filtrates of the nasal secretion of patients with acute coryza produce a similar disease when introduced into the upper respiratory passages of other individuals or of chimpanzees. The experimental disease is spread from animal to animal by direct contact as it is in human beings. The virus has been maintained in vitro for as long as thirteen days and is then avirulent for man.

Douchez has shown that during an acute cold there is only a slight increase in the normal or transitory flora of the upper respiratory passages but that pathogenic organisms such as hemolytic streptococci, staphylococcus aureus and the influenza bacillus appear in many cases. During or soon after the acute stage the bacteria may extend along the mucous membranes to the middle ear, sinuses, or lower respiratory tract or via the lymphatics to the regional lymph nodes and establish infection. In addition distant structures may be involved through the systemic circulation.

A five year old child had an ordinary cold and was confined to her bed for three days. Nine days

later she developed a mild sore throat, malaise, anorexia and a fever of 103. Examination showed a generalized lymphadenopathy and a number of blue-red macular skin lesions. After a few days all symptoms disappeared. This case represents a group in which almost any type of skin lesion may develop a week or so after a cold, probably on an allergic basis.

A second patient developed fever, hematuria and edema several weeks after acute otitis media. This group is well recognized and the renal changes are usually considered as allergic.

A ten year old girl had acute rheumatic fever with carditis four years ago and had since gone through both scarlet fever and diphtheria without complications. She recently developed an ordinary cold and was kept in bed for two weeks but a few days after being allowed out of bed she developed acute rheumatism in both hip joints. English workers have recently shown that various manifestations of rheumatic fever are very likely to develop one to four weeks after a common cold in rheumatic children. The frequency of this complication can be lessened by the early administration of salicylates and such children should be kept in bed for longer than two weeks following acute coryza.

Dr. Blackfan stated that doctors and parents should consider a cold as a serious, perhaps even a fatal disease, and should take every precaution to prevent the many complications that may develop.

Dr. Frank Ober presented several cases of osteomyelitis. A seven year old boy fell, striking his right knee. When first seen nine weeks later he had a dislocated hip and evidence of inflammation in the hip joint. A large amount of pus was found in the joint cavity at operation and the dislocation reduced. Healing was satisfactory but there was some residual deformity and limitation of motion. After four years he developed pain and swelling of the right thigh which proved to be due to an osteomyelitis of the shaft of the femur. This was drained with satisfactory healing but just when he was ready for discharge he developed a Brodie's abscess of the lower portion of the left tibia. This case illustrates a type found in a group of patients in whom multiple low-grade infections occur over a period of years and in whom there is little or no constitutional reaction.

A nine year old boy complained of pain in the right leg and had had a slight limp for two weeks. Roentgen examination showed a Brodie's abscess of the neck of the femur near the epiphyseal line which was satisfactorily drained with a good result. The process had undoubtedly been present for a much longer time but symptoms did not develop until the inflammatory process began to cause irritation at the epiphyseal line.

A colored girl of nine years developed a limp and pain in the right knee shortly after a fall. X-ray showed an area of rarefaction in the medical aspect of the upper end of the tibia near the epiphyseal line. The Wassermann reaction was positive but there were no stigmata of congenital lues. The lesion in the tibia was exposed surgically and packed by the Orr method. When the dressing was removed eight weeks later no healing had occurred. Healing began promptly when antiluetic treatment was instituted and was soon complete. In this case operation was probably unnecessary as lues may be assumed to be the etiologic factor.

Dr. Lyman Richards spoke on the "Differential Diagnosis of Orbital Swellings." An acute unilateral orbital swelling may be an early erysipelas or may be secondary to cavernous sinus thrombosis, dacryocystitis, or sinusitis. Erysipelas extends rapidly, there is severe constitutional reaction and the diagnosis is usually obvious after a few hours. Cavernous sinus thrombosis is usually bilateral, accompanied by edema of the conjunctiva, retinal changes, severe toxemia, and is rapidly fatal. The latter two conditions may be confused but conservative treatment with hot applications will differentiate them in a day or two.

Orbital swelling as a complication of sinusitis is most frequently seen in ethmoidal infections but may be seen when the maxillary sinus alone is involved. The swelling may be nonpurulent, due to edema, or purulent in which case pus collects between the ethmoid bone and the orbital periosteum. It is impossible to differentiate the two types early in the course. Hot applications should be used until the swelling subsides or there is moderate protrusion and fixation of the globe indicating the accumulation of pus. Surgical drainage should then be instituted.

Dr. Richards' patient developed edema and redness of the right upper lid during an acute sinusitis involving the ethmoid sinuses and the right maxillary sinus. After conservative treatment for two days there was slight protrusion and fixation of the globe. Under avertin anesthesia a semilunar incision was made above and medial to the inner canthus and a small abscess located and drained. At a second operation ten days later the ethmoid and maxillary sinuses were drained into the nose and the external wound was closed. She has had an uneventful convalescence and the cosmetic result promises to be excellent.

NEW YORK TUFTS COLLEGE MEDICAL CLUB

At the March meeting of the Tufts College Medical Club, New York City, the following officers were elected:

Dr. M. Coleman Harris, President.

Dr. Samuel Adams Cohen, Vice President.

Dr. Emmanuel Wm. Billard, Treasurer.

Dr. Walter R. Loewe, Secretary, 12 East 86th Street, New York City.

Hereafter meetings will be held regularly the first Thursday of each month.

CAMBRIDGE MEDICAL IMPROVEMENT SOCIETY

The Cambridge Medical Improvement Society met at the Harvard Faculty Club, Cambridge, on March 14, at 8:30. Dr. Harold A. Chamberlin and Dr. William J. Macdonald were the speakers of

the evening. Dr. Chamberlin spoke upon Urological problems. Dermatological progress was Dr. Macdonald's topic, illustrated with lantern slides.

WILLIAM J. MACDONALD, M.D.

BAY STATE MEDICAL, DENTAL AND PHARMACEUTICAL SOCIETY

Dr. Benjamin Parvey spoke before the Bay State Medical Society at the society's March meeting at 558 Massachusetts Avenue, Boston.

The subject was "More Recent Experiments with the Zondek-Aschheim Test in the Early Diagnosis of Pregnancy."

The doctor said that the test was based on the studies of Zondek and Aschheim in 1925 which showed that the hormone of the anterior lobe of the pituitary body was normally excreted in the urine of pregnant individuals, and that such urine was capable of producing estrus. He believed the test to be very accurate. In a study of nearly two thousand cases, all agreed with the clinical diagnosis as proved by the clinical course.

The test is positive very early in pregnancy, even as early as five days after the expected menstrual period.

The technique he mentioned briefly was the subcutaneous injection of the urine of a pregnant woman into mice or rabbits and the examination about 100 hours later for the characteristic ovarian and corpus lueteal changes and blood points.

Following the citation of a number of case histories, the speaker demonstrated by laparotomy the blood points in the ovaries of a rabbit injected five days previously.

An informative question period followed.

N. LOWE BURNETT, M.D., *President.*

THE WILLIAM HARVEY SOCIETY

The regular meeting of the William Harvey Society was held in the Beth Israel Hospital on March 11. Dr. Abraham Myerson introduced the speaker of the evening, Dr. Walter B. Cannon, who discussed "Vivisection and Animal Experimentation."

The anti-vivisectionists have attacked the experimental use of animals on these grounds: (1), that the use of animals in the laboratory is characterized by extreme cruelty; (2), that such use is futile since it has resulted in no advantage to man; and (3), that even if a man has profited, such experimentation is immoral.

Dr. Cannon pointed out that most of the progress in the last 70 years in medicine could be ascribed to the introduction of animal experimentation. Knowledge in all sciences is acquired either from observation or experiment. The latter is the method of modern science and is by far the most fruitful. This is illustrated by the recent rapid progress in chemistry and physics, sciences in which the experimental method may be employed, contrasted with the slower accumulation of knowledge in certain aspects of geology, in which observation alone may be applied.

Before the middle of the last century, simple observation was the chief method used in medicine. Since then, according to Osler, the experimental approach to medical problems resulted in the accumulation of more knowledge in fifty years than was gained in the previous twenty-three centuries.

Animal experimentation has been of untold advantage in the progress of bacteriology. Pasteur's work on silkworms opened the field. Koch used the guinea pig when he was investigating his newly-discovered tubercle bacillus. Trudeau proved the value of fresh air and sunlight in the treatment of tuberculosis by experiments with rabbits. The method of infection in bubonic plague, learned from experiments on animals, necessarily had to be discovered before the disease could be controlled. Knowlege of diphtheria infection was gained from Loeffler's inoculations of guinea pigs and rabbits. Antitoxins were later developed; it is to animals that we owe this method of therapeusis.

Such knowledge of disease, combined with the use of specific antitoxins, has lowered the death rates in many of the infectious diseases tremendously. Thus the death rate from diphtheria thirty years ago was eighty per hundred thousand popuiation, while now it is only five to ten. Moreover the symptoms of such diseases can often be relieved by the specific treatment.

Surgery is also dependent on animal experiments for progress. Lister introduced his method of antisepsis after watching the healing of wounds under the influence of carbolic acid in lower animals. The localization of brain centers, the methods of gastro-enterostomy, of bowel resection, and of chest surgery are examples of advances in these fields resulting from animal experiments.

Many new drugs have been developed, the toxicity of others has been discovered, and still others have been standardized by experimental methods as applied to animals. The narcotic group of drugs, and salvarsan were first tried on animals.

The diagnosis of disease is in many cases dependent upon tests on or reactions by animals. Tuberculosis, typhoid, plague, actinomycosis, and many others often require the use of animals for early diagnosis.

The entire structure of physiology rests upon animal experimentation. For example, practically all that is known of the cardiovascular, the digestive, and the nervous systems was obtained in this way. Knowledge of such important diseases as diabetes and pernicious anemia developed after some conception of the pathogenesis was obtained from animal experiments.

Not only has man gained from these experiments, but such diseases of domestic animals as tuberculosis, glanders, and actinomycosis are being controlled after experiments on diseased herds.

Such evidence shows conclusively the value of animal experimentation. To those persons who object, saying that it is immoral, since it causes pain,

the question may be put, as to why the few animals used in the laboratory are of any significance compared with the great number slaughtered for food, or with those killed to clear the streets. Thus, in Boston alone, fifty thousand dogs and cats are killed annually. Furthermore, human beings do not hesitate to sacrifice their fellow men in war, for what is apparently their common good.

Needless pain is always avoided in laboratories. All experiments must be done with anesthesia if the experiment will cause more discomfort than the anesthetic, unless the director of the laboratories decides that an anesthetic cannot be used.

NORFOLK DISTRICT MEDICAL SOCIETY

A regular meeting of the Norfolk District Medical Society will be held in the Boston Medical Library, 8 The Fenway, Boston, Mass., March 29, 1932, at 8:15 P. M. Telephone Commonwealth 2800.

The first speaker of the evening will be the Hon. James M. Curley, Mayor of Boston.

Communications:

Dr. Francis X. Mahoney, Health Commissioner, "Public Health."

Dr. Charles F. Wilinsky, "Municipal Preventive Medicine."

Dr. W. H. Griffin, "The Dental Program of the Boston Health Department."

FRANK S. CRUICKSHANK, *Secretary.*

BETH ISRAEL HOSPITAL PEDIATRIC CLUB

The next meeting of the Pediatric Club will be held on Thursday, March 31, in the Beth Israel Hospital Auditorium at 8:15 P. M. Program: Heliotherapy—Its Use and Limitations, Edwin T. Wyman, M.D. RUTH WEISSMAN, M.D., *Secretary.*

THE NEW ENGLAND DERMATOLOGICAL SOCIETY

The annual meeting of the New England Dermatological Society will be held on Wednesday, April thirteenth. There will be a clinical meeting at the Boston City Hospital Skin Out-Patient Department at three o'clock and a dinner at the University Club at seven P. M.

WM. P. BOARDMAN, *Secretary.*

BRISTOL COUNTY ORTHOPAEDIC CLUB

The Spring Meeting of the Bristol County Orthopaedic Club will be held at the Lakeville Sanatorium, Middleboro, Mass., on March 25, 1932, at 10:00 A. M., as guests of Dr. Z. B. Adams.

Dr. Adams will perform a "Fusion Operation on the Spine" at 10:00 A. M., and then demonstrate cases in the wards.

Dr. Alley, Superintendent, has invited the members to have lunch with him at 1:00 P. M.

Any one who would be interested in attending will please notify the Secretary.

This will prove to be a very interesting meeting and everyone should attend.

EARLE E. HUSSEY, *Secretary.*

38 Rock Street, Fall River, Mass.

SOCIETY MEETINGS

CONGRESSES AND CONFERENCES

March 25—Bristol County Orthopaedic Club. See notice elsewhere on this page.

March 26—Examination Conducted by the American Board of Obstetrics and Gynecology (written) — May 10 (general, oral and clinical). See page 252, issue of February 4.

March - April, Autumn — International Postgraduate Courses in Berlin. See page 1169, issue of December 10.

March 31—Cutter Lecture on Preventive Medicine. See page 650.

March 31—Beth Israel Hospital Pediatric Club. See notice elsewhere on this page.

March 31—Medical Clinic at the Peter Bent Brigham Hospital. See page 650.

April 4-8—The American College of Physicians. See notice on page 1232, issue of June 4.

April 6 - June 1—New England Heart Association. See page 891, issue of October 29.

April 7 and 8—Clinics for the Demonstration of Cured Cancer Cases. See page 486, issue of March 3.

April 8, 15 and 22—Thomas W. Salmon Memorial Lectures. See page 650.

April 13—New England Dermatological Society. See notice elsewhere on this page.

May 9-13—American Medical Association, New Orleans, La.

June 6, 7, 8, and 9—National Tuberculosis Association. See page 598, issue of March 17.

June 8, 9, 10—Massachusetts Medical Society, Hotel Statler, Boston.

June 21-24—Catholic Hospital Association. See page 369, issue of February 18.

September 19-22 — International Congress of Biliary Lithiasis. See notice on page 427, issue of February 25.

October 24-27 — American Public Health Association. See notice on page 1321, issue of December 31.

October 24-28—Inter-state Postgraduate Medical Association of North America. See page 39, issue of January 7.

DISTRICT MEDICAL SOCIETIES

Essex North District Medical Society

May 4—Annual meeting at Lawrence.

Essex South District Medical Society

April 6, Wednesday—Essex Sanatorium, Middleton. Clinic 5 P.M. Dinner 7 P.M. Speaker, Dr. Arthur P. Wakefield, State Department of Health. Subject: 10-Year Tuberculosis Program in the Public Schools.

May 5, Thursday—Censors' Meeting, Salem Hospital, 3:30 P.M.

May 10, Tuesday—Annual Meeting. The Tavern, Gloucester. Speaker and subject to be announced later. Ladies invited.

Franklin District Medical Society

May 10—Meeting at the Weldon, Greenfield, at 11 A.M.

CHARLES MOLINE, Secretary.

Middlesex East District Medical Society

May 11 (Unless otherwise announced)—At Woburn.

Norfolk District Medical Society

March 29—See notice elsewhere on this page.

May—Annual Meeting, date and place to be announced.

May 5—Censors' Meeting for examination of candidates. Roxbury Masonic Temple, 171 Warren Street, Roxbury, 4 P.M. Fee $10.00 payable at time of examination. All candidates will have applications in the hands of the secretary one week prior to this date. All candidates from Medical Schools not on approved list of Society must have application complete two weeks prior to date of examination.

F. S. CRUICKSHANK, Secretary.

Norfolk South District Medical Society

April 7—To be announced later.

May 5—Annual Meeting.

The time of all meetings is 12 o'clock noon, at the Norfolk County Hospital, South Braintree. Censors will meet on May 5 at 11:15 A.M. at the Norfolk County Hospital.

N. R. PILLSBURY, Secretary.

Suffolk District Medical Society

March 30—See page 598, issue of March 17.

April 27—The Annual Meeting, Boston Medical Library. Election of Officers.

The Medical Profession is cordially invited to attend these meetings.

REGINALD FITZ, M.D., Vice President.
LELAND S. McKITTRICK, M.D., Secretary.
HILBERT F. DAY, M.D., Boston Medical Library.

Worcester District Medical Society

Wednesday evening, April 13—Grafton State Hospital, North Grafton, Mass. 6:30—Dinner, complimentary by Grafton State Hospital. 7:45—Program to be announced later.

Wednesday afternoon and evening, May 11—Annual Meeting. Program to be announced later.

ERWIN C. MILLER, Secretary.